amateur radio

Vol. 36, No. 10
OCTOBER 1968

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Members of the W.I.A. should refer all enquiries regarding delivery of "A.R." direct to their Divisional Secretary and not to "A.R." direct. Non-members of the W.I.A. should write to the Victorian Division, C/o. P.O. Box 36, East Melbourne. Two months' notice is required before a change of mailing address can be effected. Readers should note that any change in the address of their transmitting station must, by P.M.G. regulation, be notified to the P.M.G. in the State of residence; in addition, "A.R." should also be notified. A convenient form is provided in the "Call Book".

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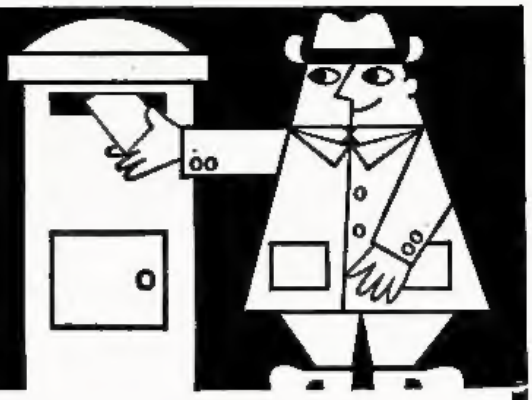

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FEDERAL COMMENT

We like to think that our members are members because they wish to be represented by a strong organisation in relation to Amateur Radio matters. It is perhaps worthwhile to give some thought to what the Institute can do, and by way of illustration, let us look at some of the things of current concern.

In recent times the use of satellites has made obvious the need for reliable low power translators. At the same time, reliance on v.h.f. by W.I.C.E.N. groups has made the use of similar techniques to materially extend reliable range in hilly areas an obvious solution to the major disadvantage of v.h.f.

Properly placed repeater units can open up wide areas to the v.h.f. enthusiast; Tasmanian Amateurs readily appreciated this, and started designing appropriate equipment. The only trouble was that the "Handbook" had never contemplated the use of these techniques in Amateur bands. In Tasmania the local V.h.f. Group and Ian Nichols, VK7ZZ, prepared a careful and detailed written submission; in Victoria the Australis Group led the way by actually developing a sophisticated translator and operating it on an experimental basis with Departmental approval subject to certain rigid conditions. What was needed was some conditions that would be generally acceptable to regulate the use of these devices, but a number of difficulties were obvious.

A permanent unattended installation was desirable, yet it had to be of a high technical standard to avoid malfunctions that could have disastrous consequences, particularly if not controlled quickly. Translators could not be permitted to appear at random. A proliferation of translators is hardly a reasonable use of v.h.f. Amateur bands.

How do you identify that a translator is being used? Should one use already regularly used channels as part of a repeater system?

The Institute took the matter up with the Central Administration of the Australian Post Office. The result of these discussions were the conditions published in last month's issue of "Amateur Radio". We thought these conditions were eminently fair and reasonable. We know that if experience shows that any particular amendment is required then the matter may be raised again.

You will have noticed that the Department requested that where possible the local Institute organisation coordinate applications for permission to operate repeaters or translators. We hope that Amateurs will look to their Divisions to do this. If translators are established in each State then an over all Australian-wide plan may be desirable, particularly for the benefit of Amateurs travelling Interstate. Perhaps another job for the Institute? Already the New South Wales Division is taking the lead in discussing this matter with the other Divisions.

Now a new matter has emerged of fundamental importance to all Amateurs and one which again calls for all of us to be represented by the one voice.

The Administrative Council of the I.T.U. has called for a world-wide session on space communications in the latter part of 1970. The last such conference was in 1963 and then the Institute participated by an Observer in Geneva for a period. It is expected that the forthcoming conference will be primarily concerned with frequencies above about 200 Mc. It has already been suggested by the A.R.R.L. that it is almost certain that one or more countries will propose taking existing Amateur allocations as a solution to the allocation problem.

Of course the forthcoming conference is not a world conference to examine and revise the whole table of allocations. This must remain for the future. When (and if) such a conference does occur the real effect of the new countries as members of the I.T.U. (the so-called "emerging nations") will be discovered.

In the future, as in the past, we shall need a strong voice to represent our hobby. We hope that this is one of the reasons why you are a member!

MICHAEL OWEN, VK3KI.
Federal Vice-President.

S.S.B. Transmitter—An Amateur Engineering Project

PART ONE

H. F. RUCKERT, VK2AOU*

WHY DID I DESIGN AND BUILD THE TRANSMITTER MYSELF?

These days commercial interests are penetrating all phases of our life and many Amateurs ask themselves whether home-brew or manufactured equipment should be their next choice. The XYL would often be in favour of the manufactured gear because the OM would not spend so much time in the shack—and provided they can still afford that new refrigerator, car or fur coat. The little boxes look more like hi-fi amplifiers and less "technical". The OM, on the other hand, has to consider several other factors important to his hobby.

I designed for over 35 years my own receivers, transmitters and aerials, and I am not a professional electronic equipment engineer. Why should I change my habit now?

Time: If I would have no time to do my hobby properly, there would be something wrong with my way of life, with most likely serious consequences. What does it matter if it takes two years to complete a home-made rig, as long as I learn what an Amateur should know about electronics today? How long does it take a university graduate to gain professional experience? We and he can never afford to stop learning. After all, I did not want to excuse my laziness or inability to learn and to understand present day Amateur Radio techniques with the popular QSO saying: "I have no time to roll my own these days!"

Some high pressure sales terms like: Hire purchase, time payments, interest rates, re-sell value, investment, never put screwdriver or soldering iron on; only serviced by manufacturer-trained personnel, in original carton, latest serial number, snob value, and home construction does not pay—are already a major source of worry for many of us as far as the day to day life is concerned and I certainly do not like to see these by-products of modern living spoil my way of serving and enjoying Amateur Radio.

QSO: We should feel sorry for Amateur Radio when a growing number of apparently proud operators read an advertisement from a magazine as a technical QSO description of their station, some of which state that the "power cord" is also included as special sales feature. This earned some op's the name "power ham" or "appliance operator".

The manufacturer goes to a lot of trouble to prepare a fool-proof instruction manual, from which we could learn a lot the other text books do not reveal, but some op's are honest enough to say that they are non-technical and have not yet studied the manual, if asked about their equipment. They may have sold their soldering iron and multimeter to help pay the deposit, and they send the gear to the service department of the dealer to have a valve replaced. Is this modern Amateur Radio? I am afraid that this attitude—also promoted by some advertisements in our magazines[1]—may ruin Amateur Radio in the long run, endanger the Amateur equipment industry and the dealer's business.

Constitution: The W.I.A. constitution lists as the first of thirty articles:

> (a) For the association of persons interested in the encouragement and scientific development of radio communication in all its branches . . ."

A change of the constitution to favour "modern attitudes" may be enough reason for the authorities to shut Amateur Radio down.

The Transmitter and Exciter on the desk with the Linear on top. The VFO stands again on top of the p.a. with heat shield underneath. Transmitter is switched to six bands, each 500 Kc. wide.

F.C.C. Rules Section 97.1[2]: "Continuation and extension of the Amateur's proven ability to contribute to the advancement of the radio art. Encouragement and improvement of the Amateur Radio Service through **rules** which provide for advanced skills in both the communication and technical phases of the art. Expansion of the existing reservoir within the Amateur Radio Service of trained operators, technicians and electronic experts."

"QST" published many hot debates in recent years concerning the new "incentive licence scheme" proposed by the A.R.R.L. and now being worked out by the F.C.C. The constitutional aims are not declared outdated, but the rules are being updated to enforce the constitution.

The new expected and proposed rules[3] seem to aim at insuring that a U.S. Amateur knows sufficient to be able to design and develop his own equipment, no matter whether he finally builds or buys his gear. The present extra class examination may have to be passed, new licence classes and call signs will have to be earned if one wishes to retain the presently held general class privileges. It is expected that up to 50% of those who thought that buying without having to learn is modern Amateur Radio, will more or less lose privileges or drop out.

Such a development would not be very popular in some countries, but it may have to come if the present trend spreads much further. Some radio inspectors seem to be quite worried about the op. who has no multimeter and often, not the know-how the present licence examination calls for.

I designed and built my own s.s.b. transmitter to examine myself, to see whether the recent electronic development had overtaken my ability to learn and to find out if an Amateur (not professional equipment engineer) can still do it. Advertisements which aim at human laziness and discourage the practice of Amateur Radio as laid down in the constitution do Amateur Radio a bad service. The authorities who allow us to use valuable frequencies don't like to see us helping to drain the country's gold reserves so that we can talk non-technical about fishing and weather on the air, but they support constitutional aims as cited above.

Youth Radio Club[4]: "To develop in young people an interest in radio and electronics, which can be pursued as a vocation or as a hobby through life—to reinforce their school studies—that they will enter those employment fields with interest and aptitudes already established."

No statement fits my own case so well as this one. Without Amateur Radio my life would have taken a far less successful turn. The method used by me may be described symbolically as holding the book in one hand and the soldering iron in the other. It can still be done today without a heavy investment the school boy and many old boys cannot afford, quite in contrast to the discouraging talk the youngsters hear so often on the bands.

If we of the second generation of Radio Amateurs demonstrate that we are not too old to learn, the third generation now entering our ranks is likely to keep Amateur Radio going for many years and this includes Amateur Radio equipment manufacturers and their dealers.

* 25 Berrille Road, Beverly Hills, N.S.W., 2209.

[1] W6KZF, "QST," December 1966.

[2] W3GD, "QST," June 1965.

[3] F.C.C's Proposals for Incentive Licensing, "QST," May 1965, page 44.

[4] VK1KM, "A.R.," October 1965.

How to Learn: The Amateur who is a professional equipment engineer or technician does not have to roll his own to learn Amateur electronics. He may get a great deal of fun testing and modifying manufactured gear. Some Amateurs had sufficient experience in the past, learned the instruction book by heart and keep their knowledge up to the mark by reading Amateur literature and enjoy technical QSO discussions or lectures given at meetings. They too could use manufactured equipment and still pass any examination an incentive licence scheme may impose.

The writer belongs to the next group who wants to find out more about details, often not published in Amateur publications, looking for the answers of the many questions "WHY" which we face when a rig is to be designed and developed. I don't mind the hard way because the pleasure of achieving something in spite of difficulties cannot be bought. One U.S. Amateur wrote in "QST": "Nobody should get pleasure out of fishing from the barrel!"

Time and Money: Amateur fishing is in many cases very uneconomical and time consuming, but this is seldom considered a deterrent. The same should go for the time spent to build a piece of Amateur equipment. Making skillful use of components collected over the years (junk box), plus those bits which are still cheaply obtainable, designing around the need for costly parts and not minding a few more knobs on the front panel, brings the price down to a fraction of manufactured gear—10% in my case here described.

IS IT EASY TO DESIGN AND BUILD A S.S.B. TX WHICH INCLUDES MANY FEATURES?

Some writers say it is easy, and their papers describe straight forward successes, causing other less clever or lucky ones to start who have little chance to succeed. Most of us need far more detailed information, stating not only again what should be done, but also why a certain way is correct, and why other apparent possibilities are wrong. I say it is a full size engineering project, and I intend to describe more the errors made earlier than the final success, in the hope to help others who got stuck half way through the job.

It is not even easy for the professional equipment designer of the manufacturer. His gear is either highly sophisticated (complex and expensive) or the price and the cabinet size are predetermined by a market survey calling again for a great engineering effort to fit many required features with a minimum of components and ease of assembly into the box. The industry cannot afford to offer too little to customers as difficult as Amateurs often are, or soon after magazines all over the world publish improvement proposals of this manufactured equipment. To get away with one valve less can be decisive in industrial design, to keep the price down, but one valve more means little to the Amateur building one—and not 10,000—of a type of a transmitter, which is an advantage for the home constructor.

THE PLANNING STAGE

During the previous minimum of the sunspot cycle I had converted my transmitter from a.m. to d.s.b., but only a few QSO partners could copy this modulation and they were the s.s.b. pioneers. To work D.X.C.C. after 1952 I had to go back to a.m. Things have now changed and it is hard to find an a.m. DX station. Therefore the present quiet sun period was used to go s.s.b. The a.m. rig was pulled to pieces, recovered components were checked and sorted out. Piles of "QST," "Amateur Radio," "DL-QTC," etc., up to 15 years old and other s.s.b. publications were checked through. Block diagrams started to emerge and were compared with those of recently manufactured equipment. They had to be adjusted to make use of components at hand, like valves, relays, air capacitors, switches, crystals and parts easily obtainable.

A list of circuit features was compiled and the designing around difficulties started. With the first circuit drawn up, the layout of parts was tried, to see how to fit everything in and how big the chassis would have to be. The desired and the also likely occurring undesired carrier, v.f.o. and c.o. frequencies and harmonics as well as the various mixer and output frequencies were determined, to see what would have to be done to prevent trouble.

Several changes had to be made at this stage and quite a number of questions showed up that my expert friends and the available literature did not answer. There was only one way, try, measure, modify and repeat the other steps until one knows why one way is better than another. This means sufficient chassis space and far more components would be needed than the circuit shows. Stage by stage construction, and step by step measuring and aligning, was necessary. Ways had to be found to obtain reliable answers with the limited measuring equipment available.

MEASURING EQUIPMENT USED

BC211: To check crystal frequencies of filter and oscillator crystals and v.f.o. calibration.

As s.s.b. receiver on the carrier, intermediate and Amateur band frequencies.

Transmitter monitor.

V.T.V.M.: To check oscillator voltages and stage gain, stage linearity.

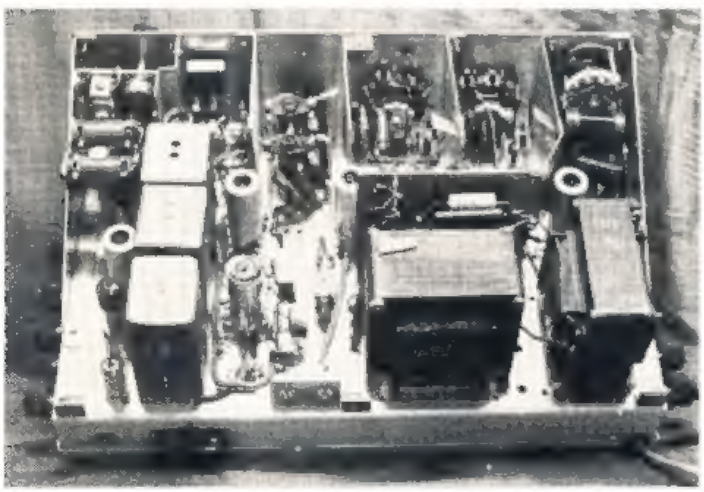
To measure output on dummy load and to calibrate the s.w.r. meter.

A.F. Generator: To check performance and a.f. response, carrier frequency position.

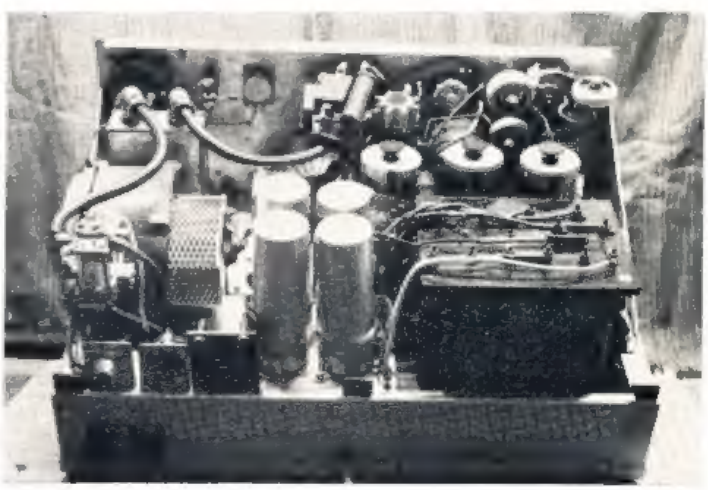
To prepare a 800 and 1,800 c/s. double tone recording to test p.e.p. rating.

Tape Recorder: As speech source when checking the various stages for distortion.

As a means to record received (with BC211 or station receiver) audio from stage to stage tests, to compare performance of different circuits and settings of controls (retaining the evidence).



Exciter chassis open, from the rear, left to right: Audio and vox valves, ring modulator and crystal filter under shielding cans, i.f. band filter, switched 2nd mixer, pre-amp. and driver tuned circuits (near front panel). Rubber pad on mains transformer prevents 50 cycle magnetic excited cover hum (steel). Flat springs on stage separating shields contact plated cover to prevent bridging of shielded coil sets with resulting feedback.

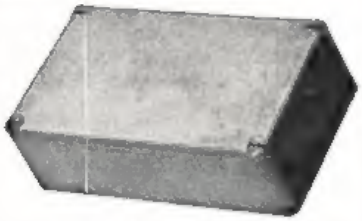


Linear-P.A., cover removed, from left to right: Aerial relay, fan and SWR (in shielding can) circuit. Four electrolytic capacitors and behind these the variable and fixed pi output capacitors (in the middle of front panel). Mains transformer, three valves, two pi coils (crossed mounted) and ceramic fixed capacitors around switch at front panel.

CITIZEN BAND TRANSCEIVERS

TOKAI Type TC-911 9-Transistor Citizen Band Transceivers. P.M.G. approved. Use like a telephone with separate microphone and receiver. Push-to-talk operation. 100 mW. input. Single rod antenna system. Range better than 2 miles over average terrain. Best we have ever tested. Best value on the market.

Price $88 pair

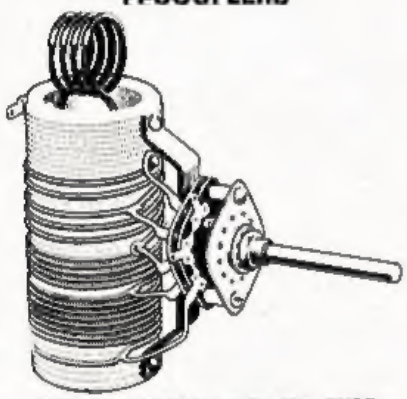


INSTRUMENT BOXES

These virtually water-tight die-cast boxes are made of zinc alloy material in four sizes. Each box is supplied with a close-fitting flange lid, securely held with countersunk 4 BA screws. Natural finish. These substantial boxes are invaluable for many purposes. Sizes available:—

Type 6808/P	(650) 4½ x 3½ x 2 In.	$2.75
Type 6827/P	(845) 7¾ x 4½ x 2 In.	$4.50
Type 7134/P	(896) 4¼ x 2¼ x 1 In.	$1.83
Type 903	7⅜ x 4-11/16 x 3 In.	$4.95

PI-COUPLERS



WILLIS MEDIUM POWER TYPE

For use up to 600 watts p.e.p. Match plate loads of 2,000 to 3,500 ohms (Z) and higher into co-axial cable. Operating Q increases on higher frequencies to increase harmonic suppression, enabling practical values of tuning capacity to be used on 10 and 15 metres and allowing for wiring inductance (L). Incorporates extra switch section for shunting additional capacity (C) if required, or switching other circuits. Switch rated for 10 amps. at 2,000 volts with contact resistant (R) of 0.8 milliohms. **Price $8.85.**

Geloso Pi-Coupler Type 4/111 for use with parallel 807s, 6146s, etc. 75 watts. **$4.00.**

Geloso Pi-Coupler Type 4/112 for use with single-ended 807, 6146, etc. 75 watts. **$4.00.**

Geloso Pi-Coupler Type 4/113 for use with parallel 807s, 6146s, etc. 100 watts. **$4.37.**

BEAM ROTATOR

German "STOLLE" Light Duty Beam Rotator. Compass point dial control box automatically positions beam on motor driven gear box at mast head. Unit supplied complete with 90 feet 5-core control cable.

Price $59.53 (Inc. Sales Tax)

PUNCHES

WILLIS HAMMER DIE PUNCHES

WILLIS hammer type die punches are made to precise sizes for use in industry wherever a clean, round hole is wanted. Designed to punch down to 14 gauge steel. Centre remnant removed with a flick of the hand. Can be used in die press. Special sizes made to order at slight additional cost.

3/8 In.	$2.40	1-1/2 In.	$6.00
7/16 In.	$2.45	1-5/8 In.	$6.40
1/2 In.	$2.60	1-3/4 In.	$7.20
5/8 In.	$2.60	1-7/8 In.	$8.00
11/16 In.	$2.80	2 In.	$8.40
3/4 In.	$3.00	2-1/16 In.	$8.60
13/16 In.	$3.20	2-1/8 In.	$9.00
7/8 In.	$3.80	2-3/16 In.	$9.40
1 In.	$3.80	2-1/4 In.	$9.60
1-1/16 In.	$4.00	2-5/16 In.	$9.80
1-1/8 In.	$4.00	2-3/8 In.	$10.40
1-3/16 In.	$5.00	2-1/2 In.	$11.00
1-1/4 In.	$5.20	2-3/4 In.	$12.40
1-5/16 In.	$5.20	3 In.	$13.40
1-3/8 In.	$5.60	3-1/4 In.	$15.80
1-7/16 In.	$5.50	3-1/2 In.	$18.20

Q-MAX CHASSIS CUTTERS

SCREW TYPE

3/8 In.	$1.80	1-5/16 In.	$2.80
7/16 In.	$1.90	1-3/8 In.	$2.80
1/2 In.	$2.00	1-1/2 In.	$3.10
9/16 In.	$2.00	1-5/8 In.	$3.10
5/8 In.	$2.00	1-3/4 In.	$3.10
11/16 In.	$2.25	2 In.	$4.75
3/4 In.	$2.25	2-3/32 In.	$5.40
13/16 In.	$2.60	2-1/2 In.	$8.35
7/8 In.	$2.60	2-5/8 In.	$11.70
15/16 In.	$2.90	2-3/4 In.	$14.67
1 In.	$2.60	3 In.	$22.40
1-1/16 In.	$2.60	11/16 In. sq. h.	$4.65
1-1/8 In.	$2.80	1 In. sq. hole	$4.85
1-3/16 In.	$2.80	21/32 x 15/16 In. rectang. hole	$8.00
1-7/32 In.	$2.80		
1-1/4 In.	$2.80		

MODULATION TRANSFORMERS

BRITISH "WOODEN"

Type No.	Audio Watts	R.F. In. Watts	Max. Sec. Current	Price
UM0	10	20	80 mA.	$16.96
UM1	30	60	120 mA.	$23.83
UM2	60	120	200 mA.	$30.96
UM3	120	240	250 mA.	$33.33

LOW PASS FILTERS

A "Cabena" Low Pass Filter will fix t.v.i. Cut-off frequency, 30 Mc., attenuation at 60 Mc. better than 30 db.; insertion loss, negligible. Impedance 50-72 ohms.

Price $12.00

GRID DIP METER

The LDM-810 LEADER Grid Dip Meter has been designed for quick checking of circuits and components in radio receivers, transmitters, antennae and a host of other electronic equipment. Using a 6CW4 Nuvistor in a stable Colpitts oscillator circuit, the unit covers a frequency range of from 2 Mc. to 250 Mc. with six well constructed and protected plug-in coils.

It features a large 310 degree calibrated dial, edgewise 500 microammeter with a polished aluminium scale backing for easy observation of "dips," an internal neon oscillator to generate an audio frequency of approximately 1 Kc. for r.f. alignment when the function switch is in the appropriate position. In alternate positions of the function switch the unit can operate as an unmodulated r.f. oscillator or a diode detector. A phone jack is also provided for the monitoring of a.m. signals with a pair of high impedance headphones when the function switch is in the "diode" position.

Price $47.75 (Inc. Sales Tax)

DOW-KEY MANUAL CO-AXIAL SWITCHES

R.f. Ratings: 1 kw. to 500 Mc. Fine silver finish. Fitted with u.h.f. type SO239 co-axial sockets.

DK78-2 Single Pole two throw	$18.85
DK78-3 Single Pole three throw	$19.10
DK78-6 Single Pole six throw	$20.79
DK78-T Transfer Switch	$19.75

AMERICAN DOW-KEY ANTENNA RELAYS

Coil Ratings: 6, 12, 24 volts d.c. at 2 watts, 6, 12, 24 volts a.c. at 6va., 50/60 cycles. Special coil voltages available on request. R.f. Ratings: 1kw. power rating to 500 Mc.; 20 watts power rating to 500 Mc. in types DK60-G and DK60-G2C in de-energised condition. The DK60-G and DK60-G2C have a special isolation connector in the de-energised position to reduce cross-talk to a minimum.

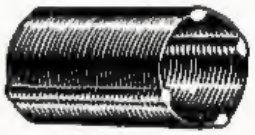
V.S.W.R.: Less than 1.15 : 1 from 0 to 500 Mc. (50 ohm load).

Isolation: Greater than 60 db. at 10 Mc. in DK60 and DK50-2C; greater than 100 db. from 0 to 500 Mc. in DK60-G and DK60-G2C when in energised position.

Operating Time: Less than 30 milliseconds from application of coil voltage; less than 15 milliseconds between contacts.

Connections: Standard SO239 type v.h.f./u.h.f. Co-ax. Connectors. Available with Type N, BNC, TNC, C Connectors to order.

	D.C.	A.C.
Type DK60 standard single-pole change-over	$18.42	$19.55
Type DK60-G standard single-pole change-over with special isolation contact in de-energised position to reduce cross-talk	$20.45	$21.45
Type DK60-2C, same as DK60, but includes external set of double-pole change-over contacts	$20.53	$21.68
Type DK60-G2C, same as DK-60-G, but with external double-pole change-over contacts	$22.16	$23.60



"WILLIS" AIR-WOUND INDUCTANCES

Take the hard work out of Coil Winding—use "WILLIS" AIR-WOUND INDUCTANCES

No.	Diam. Inch	Turns per Inch	Length Inch	B. & W. Equiv.	Price
1-08	½	8	3	No. 3002	65c
1-16	½	16	3	No. 3003	85c
2-08	⅝	8	3	No. 3006	77c
2-16	⅝	16	3	No. 3007	77c
3-08	¾	8	3	No. 3010	90c
3-16	¾	16	3	No. 3011	90c
4-08	1	8	3	No. 3014	$1.05
4-16	1	16	3	No. 3015	$1.05
5-08	1¼	8	4	No. 3018	$1.40
5-16	1¼	16	4	No. 3019	$1.40
8-10	2	10	4	No. 3907	$1.70

Special Antenna All-Band Tuner Inductance (equivalent to B. & W. No. 3907 7 In.)

7 in. length, 2 in. diameter, 10 turns per inch, $3.00

References: A.R.R.L. Handbook, 1961; "QST," March 1959; "Amateur Radio," Dec. 1959.

WILLIAM WILLIS & CO. PTY. LTD.

430 ELIZABETH STREET, MELBOURNE, VIC., 3000 **Phone: 34-6539**

Dummy Load: A 52 ohm low s.w.r. dummy load (Heath Cantenna) capable to handle 400 watts p.e.p. output or more for an hour or longer. Light globes have often too much impedance and an unstable resistance under speech pulse conditions, which can cause misleading results.

Multimeter and **r.f. amp. meter.**

G.D.O.. To prealign tuned circuits, as L-meter with known C

Absorption Wave Meter: To check frequency combinations at the various stages

THE FREQUENCY PLAN OF THE TRANSMITTER

Our a.m. rigs often had the v.f.o. on the 160 metre or 80 metre bands and a string of frequency multipliers gave the output at the desired band. With s.s.b., frequency multiplication would increase the transmitted frequency spectrum and at the receiving end the same frequency division would be necessary to restore the original audio pitch. To overcome these difficulties, s.s.b. transmitters use one or more frequency conversions which are often upward in frequency, in contrast to most superhet. receivers which use one or more downward conversions. A mixture of upward and downward conversions is employed where a high frequency filter (often 9 Mc. or 5 Mc.) is used in the transmitter, receiver or transceiver. This means that the superhet. problems like unwanted mixer products, oscillator output, image signals, harmonics, p.a. feed back to mixer frequencies, the adjustment of oscillator to input signal level, mixer gain and transmitter (receiver) selectivity will be encountered.

It is therefore very helpful to draw up a frequency plan to see what will happen at the various stages.

Tables A1 and A2 show an example of the frequencies used for l.s.b. and u.s.b. 14 Mc. transmission. It is important to note that a sideband inversion of the output signal takes place where the oscillator frequency is higher than the s.s.b. input frequency. What was lower sideband up to the second mixer becomes upper sideband from here on in this case.

Table B lists the transmitter stage frequencies for the lower band edges of six band segments. This calculation shows which crystal frequencies the c.o. of the second mixer should have, with the carrier, v.f.o. and intermediate frequency being always the same.

Table C gives some idea of the number of signals and their frequencies we may find in the output of the first and second mixer and also in the aerial. To these we have to add harmonics of the various oscillators and the mixer products these form. If the p.a. is not

SSB TRANSMITTER FREQUENCY PLAN

AF	0 →	3 Kc.	audio	
Carrier	413	413 Kc.		
SSB, USB	413 →	416 Kc.	bal.	modulator, filter
VFO	4.034	4.034 Mc.		
SSB, USB	4.447 →	4.450 Mc.	upper s.b.,	1st mixer
CO ..	18.447	18.447 Mc.		
SSB, LSB	14.000 →	13.997 Mc	lower s.b.,	2nd mixer

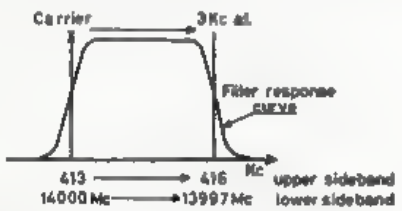


Table A1.

AF	3 ←	0 Kc.	audio	
Carrier	416	416 Kc.		
SSB, LSB	413 ←	416 Kc.	bal.	modulator, filter
VFO	4.034	4.034 Mc.		
SSB, LSB	4.447 ←	4.450 Mc.	lower s.b.,	1st mixer
CO	18.447	18.447 Mc.		
SSB, USB	14.000 ←	13.997 Mc.	upper s.b.,	2nd mixer

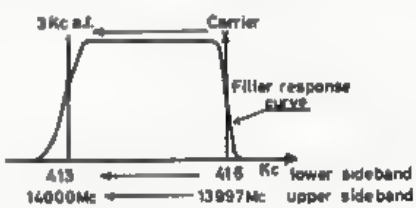


Table A2.

80 Metres			**15 Metres**	
Carrier		0.414 Mc.	Carrier	0.414 Mc.
VFO	+	4.036 Mc.	VFO	+ 4.036 Mc.
	—	4.450 Mc.		— 4.450 Mc.
CO		7.950 Mc.	CO	25.450 Mc.
		3.500 Mc.		21.000 Mc.
40 Metres			**10 Metres**	
Carrier		0.414 Mc.	Carrier	0.414 Mc.
VFO	+	4.036 Mc.	VFO	+ 4.036 Mc.
	—	4.450 Mc.		— 4.450 Mc.
CO		11.450 Mc.	CO	32.450 Mc.
		7.000 Mc.		28.000 Mc.
20 Metres			**10 Metres**	
Carrier		0.414 Mc.	Carrier	0.414 Mc.
VFO	+	4.036 Mc.	VFO	+ 4.036 Mc.
	—	4.450 Mc.		— 4.450 Mc.
CO		18.450 Mc.	CO	32.950 Mc.
		14.000 Mc.		28.500 Mc.

Table B.

15 Metres			**Combinations**
Carrier O.	0.414 —	0.414 Mc.	a
VFO	4.036 ←	3.536 Mc.	b
	Output from 1st Mixer		
VFO	4.036 ←	3.536 Mc.	b
— 1st Image	3.622 ←	3.122 Mc.	(b — a)
+ 1st Mixer	4.450 ←	3.950 Mc	(b + a)
CO	25.450 —	25.450 Mc.	c
	Output from 2nd Mixer		
— VFO Image	21.414 →	21.914 Mc.	c — b
— 1st Image	21.828 →	22.328 Mc.	c — (b — a)
— 2nd Mixer	21.000 →	21.500 Mc.	c — (b + a)
+ VFO Image	29.486 ←	29.986 Mc.	c + b
+ 1st Image	29.072 ←	28.572 Mc.	c + (b — a)
+ 2nd Image	29.900 ←	29.400 Mc.	c + (b + a)
VFO	4.036 ←	3.536 Mc	b
CO	25.450 —	25.450 Mc.	c

Table C.

sufficiently isolated from the mixer stages, its radiation may reach the mixer stages and mix with these also, to form output signals which may not be sufficiently sorted out by the following tuned circuits. Non linear operation of the later transmitter stages can make things quickly worse.

Broad band tuned circuits used to avoid costly ganged tuning, or an insufficient number of tuned circuits to save components and to reduce the number of knobs on the now often too small front panel, heavily loaded driver and p.a. tanks, have little selectivity near resonance or far off. It is very interesting and it can be strongly recommended to check the transmitter output with an absorption type wave meter or better still with a general coverage short wave receiver. Don't mix up receiver image signals with transmitter spurious signals. This investigation will tell whether more selectivity has to be used or where traps should be installed. Manufactured transmitters are an example showing where design short cuts had to be fixed by traps.

Checking the transmitter output at only one frequency per band is often no safeguard, because certain beat notes will only show up within a limited band segment depending on the frequency of the other tuned circuits involved. All this makes it clear why I had to replace three multiband tank circuits, following the 2nd mixer, pre-amplifier and driver earlier used, to avoid band switching and the many coils now needed. There were so many signals close together that tuning up on an out of band frequency was hard to avoid.

As we know from publications, many different combinations and mixer arrangements may be used. Each method has certain merits but also problems. One should work out a frequency plan before crystals are bought and holes are drilled in the front panel. Make sure not to transmit on a frequency used by the Navy or Airport authorities. A spurious signal of 4w. over a few miles may be too much for them, whilst the Amateur reckons that 40 db. suppression of the unwanted signal, compared with the 400 watts p.e.p. legal signal, is all he has to do.

An aerial coupler, a more selective matched directive aerial, more traps or a low pass filter may be required. A change of the operating conditions (grid bias, screen grid voltage, balancing, shielding, installation of grid or plate suppressors) of valves and transistors can often solve the observed problem. The evil has to be noticed and pinned down before a cure is tried and affected, so tests have to be made and the findings interpreted.

THE BLOCK DIAGRAM

The heptode and triode of a 6AJ8 act as r.f. pre-amplifier, followed by a slow decay fast attack a.f. compressor, which was described in "QST" by W3ZVN. A 6BA6 is the a.g.c. valve supplying 10% of its output voltage to the ring modulator (balanced modulator). The full a.f. output goes to one half of a 12AT7 vox amplifier. The anti trip amplifier EF12 (9001 or any low gm valve) is in this case part of the receiver. A 6AL5 rectifies both a.f. voltages, compares them and controls the other half 12AT7 relay valve operating the standby relay.

A 6AU6 is found in the s.s.b. carrier oscillator with crystals for lower or upper sideband operation. The two section half lattice filter passes one sideband, depending on the carrier frequency crystal selected. A 6AJ8 heptode amplifier with high gain reserve follows on 414 Kc. The triode acts as a.m. carrier oscillator, and the heptode serves as a.m. mixer (modulator). The s.s.b. carrier is switched off (B+) in this case.

Two nearly identical twin triode balanced mixer stages follow with 12AT7 valves. The first mixer converts the 414 Kc. signal to the 4.45 to 3.95 Mc. intermediate frequency. A frequency linear v.f.o. with a 12AT7 Franklin oscillator and 6AG5 buffer belongs to this mixer. The second mixer with a 6AM6 oscillator is crystal controlled to cover six band segments. A 6AK5 acts as buffer for the c.o.

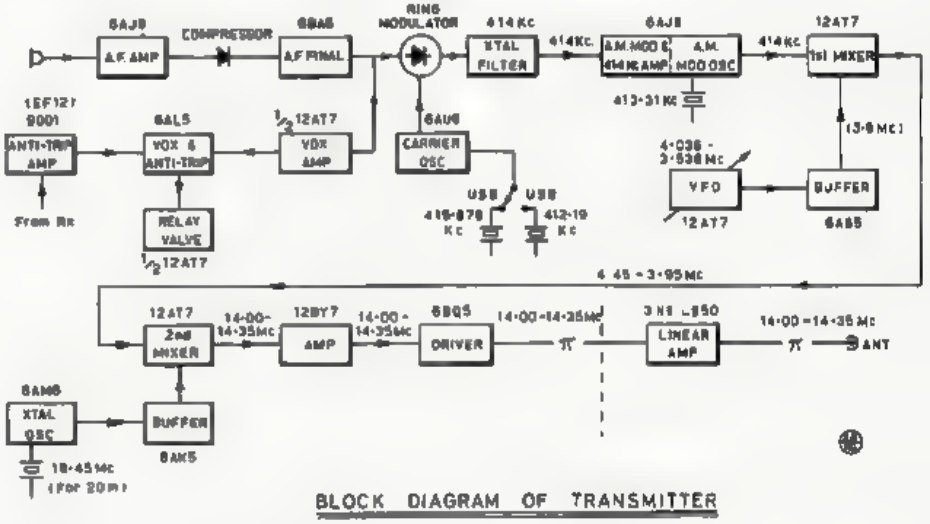
A 12BY7 pre-amplifier and a 6BQ5 driver with stagger tuned switched tuned circuits and a pi circuit for the driver complete the exciter. The pi output capacity of this tuned circuit is formed by 15 pF. from the co-axial cable connecting exciter and p.a., and parallel to this is the combined input grid to cathode capacity of the three valves used in the linear p.a. (3 x 15 pF.). Adjustable netting level, selectable a.l.c. level as well as driver r.f. output measuring (exciter tuning indicator) are also provided. The exciter has its power supply built in.

The v.f.o. is in a separate box to reduce heating up and temperature drift. The c.o. is at the moment jointly used in the receiver and transmitter, but there is enough space in the v.f.o. box to include later a separate c.o. for which the crystals have already been obtained.

The linear amplifier is housed in a separate cabinet matching the exciter in width and depth, including power supply, s.w.r. meter, watt meter, grid current meter, multimeter with seven positions, aerial relay, cooling fan (blower type).

The transmitter is also band switched for the full 80, 40, 20, 15 metre bands, and on 10 metres with two 500 Kc. segments between 28 and 29 Mc. Voltage stabilisers cover all critical voltages in the exciter and p.a. The h.t. voltage is well regulated, having a low resistance circuit and large storage capacitors.

(To be continued)



BLOCK DIAGRAM OF TRANSMITTER

ERECTION STARTS ON EAST-WEST LINK OF WAVEGUIDE AND ANTENNAE

A 1968-style outback convoy of vehicles carrying equipment and men to work on one of the nation's biggest telecommunications projects is working its way slowly across the Nullarbor Plains.

The men, from Andrews Antenna Pty. Ltd., are erecting 142 antenna dishes at the top of 60 microwave radio towers between Port Pirie in South Australia and Northam in Western Australia. Each dish will be connected by a waveguide to a power unit at the base of each tower.

Riggers will spend ten months climbing to the top of the 250 ft. high microwave radio towers. The towers average 25 miles apart and span a total distance of 1,400 miles.

They form the East-West microwave radio trunk telecommunications system now being built by the Australian Post Office at a cost of more than $3 million. It is one of the longest microwave telecommunication systems in the world and equals the distance from London to Moscow.

When completed early in 1970, it will carry telephone, telex and telegraph traffic with provision for television relays between Perth and Adelaide. It will increase available telephone circuits from hundreds to thousands and will supersede the existing aerial wire trunk system first established in 1877, but subsequently re-built and extended over the years.

The antennae being erected were manufactured by Andrew Antennas Pty Ltd., of Melbourne, and the connecting waveguide by the parent company, The Andrew Corporation of Chicago, one of the biggest manufacturers of microwave radio equipment in the world.

The company's engineering team will spend 10 months in the desert and includes an engineer, a technician, three riggers, a cook and an inspector.

Two drivers will run a shuttle-service every two weeks between Melbourne and the Nullarbor area delivering the 142 antenna dishes to the microwave tower sites.

In addition to the transport vehicles, the convoy includes an air-conditioned instrumentation van, and two Rolls Royce army scout cars each towing a 26 ft. long caravan. One of the caravans provides living accommodation and the other is a mobile restaurant.

For a large part of the route, the microwave radio system will follow a path near the coast and to the south of the actual Nullarbor Plain. The huge towers will be visible in some places from both the road and the Transcontinental Railway.

"THE WORLD WITH A TRIANGLE"

WAL SALMON, VK2SA*

The title of this article is rather unusual and I did have in mind an alternative title, "How to Beat the Quad" which I think would have been more to the point after the severe winds over the last week-end.

The article is written around an antenna development which has its origin in the "7 Mc. Corner Antenna" devised by the author (reference "Amateur Radio," Vol. 35, No. 4, April 1967). Hundreds of excellent DX contacts have been made on this antenna on 7 Mc. and 14 Mc. and on many occasions when I gave the technical details the guy at the other end asked "Can you rotate it?" This of course is the 64-dollar question.

The main lobes of radiation are restricted so far as directivity is concerned and thought was then given to the possibility of utilising two antennas with a versatile feeder patching arrangement and the ultimate goal was an array to work four main directions and so virtually cover the world. This endeavour has been achieved at VK-2SA without resort to Quads, Yagis or rotating mechanism.

Fig.1. Dipoles

Reference might now be made to the dipole in the original article in "A.R." April 1967 and for space convenience alone, it was decided to adhere to the original dipole specification. Reference might now be made to Fig. 1. The total length of the dipole is 42 feet plus 4 inches, which is the length of the plastic 1½ inch centre loading coil former. The coil is wound with 23 turns close spaced enamel and doped and covered with plastic tape. The dipole was then resonated to 7 Mc. **before connection to the feeder.**

An examination of the characteristics of the dipole indicate that it can be regarded as a centre loaded half wave dipole for 7 Mc., two half waves in phase for 14 Mc. and I leave any suggestion as to what it might be for 21 Mc. to readers as I don't operate on 21 Mc.

No one will deny that two half waves in phase for 14 Mc. is a useful antenna and when used with a similar dipole as a tuned reflector it could be extremely useful. This deduction has been borne out at VK2SA and reference might now be made to Fig. 2. The triangular formation of the antenna array will be immediately apparent. The scale is 1/10 inch to 1 ft. and the dipoles are numbered and No. 1N and No. 1S comprise the North/South antenna. No. 2E and No. 2W comprise the East/West antenna

The antennas are fed with open wire line and by tapping directly across the centre loading coil a high impedance point is available and all-band operation from 7 Mc. up is easily achieved.

The four feed lines from the dipoles are brought into the shack and terminate on a patchboard directly over the transmitter.

Reference might now be made to Fig. 3. It will be seen that two units, namely an antenna coupler and a "Reflector Tuner" unit, can be connected to any pair of feeders, thus facilities are easily available for the dipoles of the N/S or E/W antennas to be used as reflectors or radiators.

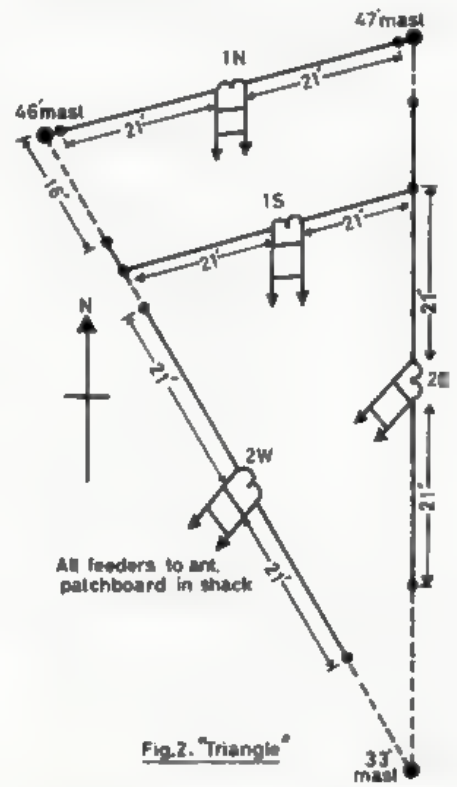


Fig.2. "Triangle"

It will be noted that the spacing between the elements of No. 1 antenna is 16 feet and the spacing of No. 2 antenna is a tapering distance due to the formation of the triangle. This is not desirable, but is unavoidable owing to the placement of the three masts at this location. The height of the masts is 47 feet, 46 feet and 33 feet respectively. Owing to the relatively large spacing between the elements, optimum results are achieved by using the second element as a **reflector** and not a **director** in any desired direction.

With regard to tuning any pair of dipoles a most desirable feature of the antenna is the use of a reflector tuner and when the reflector tuner condenser is adjusted so that the capacity is set just past resonance on the low frequency side, the next process is to adjust the antenna coupler controls till you get the greatest amount of r.f. in the reflector as indicated by a single turn and pea lamp. I use an r.f. ammeter in the reflector tuner closed circuit. I am quite convinced that this method of tune up is more positive and efficient than watching an s.w.r. meter.

So now we talk to the world without a Quad and how! The antenna described went into operation at VK2SA on 29th July, 1967, and reports of S7, S8 and S9 have been received on s.s.b. and c.w. from Europe, short path and long path, and the United States and Alaska, short and long path. The system works as a two element array on 7 Mc. in all directions and I have worked JA land S7 on s.s.b. and S8 on c.w. A good one last night was VS9MB, Maldive Islands, at S7 (s.s.b.) on 14 Mc.

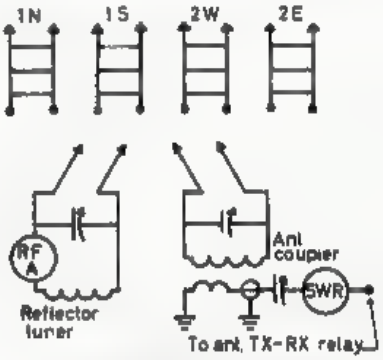


Fig.3. Antenna feeder patchboard

In conclusion, I cannot help remarking about a character who said to me, "What, a new antenna, you remind me of the guy who used to put a new antenna up every month and every one worked better than the previous one." Come in on a QSO with me some time, you may beat me by a few decibels, but you still say I can hold my own with most Quads and Yagis.

— · · · —

OPEN-WIRE DEVELOPMENT

Developed originally in the U.S.A., a 300 ohm open-wire transmission line is now available in Australia. Early experiments here by the manufacturers, E. W. Cornelius Pty. Ltd., and Channel Master engineers, resulted in the "Lo-Loss" Formula III. open-wire line being produced.

Formula III. design incorporates a polythene sheathed, solid copper conductor, separated by hard polythene spacers, to give a constant standard transmission line impedance of 300 ohms. Laboratory tests have shown that Formula III. open-wire line has negligible capacitance and less than one-third the losses of flat feeder cables.

Further technical information may be obtained by writing to the manufacturers, E. W. Cornelius Pty. Ltd., 182 Bay St., Brighton, Vic

* 77 Flora St., Kirrawee, N.S.W., 2232.

When Are They Biting?

M. N. O'BURTILL,* VK3WW

Chasing DX has been likened to catching fish. You must use the right equipment in the right spots when the fish are biting. I leave the choice of equipment up to the individual. The right "spot" is usually indicated on the Prediction Charts, the use of which has been very well covered previously. When are they biting? (I don't know, but I am sure an understanding of local and DX time zones would help your "fishing".)

Most communication organisations use G.M.T. as the standard recorded time and Amateurs are encouraged to log times in G.M.T. In contest work this is essential and in general operating, it is much easier when recording information on QSLs, etc.

What ever time standard you use in your log you still have to consider the relationship between local time at your QTH and that of the DX you wish to work. It is pointless calling CQ with the beam on an area in which it is 3 a.m. and no stations are operating.

On any reasonable world map you will see lines running North and South. These are known as meridians and run in a straight line from pole to pole. The zero degree meridian runs through Greenwich, England, and longitude is the angle measured West or East of Greenwich. The meridians are named by their angular distance East or West of the zero degree meridian. Every one degree of longitude represents a time differences of four minutes or fifteen degrees equals one hour.

By applying this principle you can calculate the actual time in any area on the earth's surface by knowing G.M.T. and the longitude of the position at which time is required. Positions East of Greenwich are ahead of G.M.T. and positions West of Greenwich are behind G.M.T.

The usual practice is to select a suitable time to cover an area rather than changing your clocks every time you travel a few miles East or West, hence we have in Australia —

W.A.S.T. = G.M.T. + 8
S.A.S.T = G.M.T + 9½
E.A.S.T. = G.M.T. + 10

I have made a chart relating local times in each area for which we have Prediction Charts, to G.M.T. and Australian times. I hope this will help Amateurs to understand the principles of time zones and at the same time provide an easy reference for working DX.

Some areas employ daylight saving during certain months of the years. To show this on a chart would complicate matters considerably, so if you are talking to Montreal and find the chart is an hour out, please don't come round and smash my clocks! I have indicated by means of an asterisk each place where daylight saving can be expected during the summer months.

Finally, the following list of countries normally operate on G.M.T.:—

Algeria, Ascension Island, Canary Islands, Channel Island, The Faeroes, Gambia, Ghana, Guinea Republic, Mauritania, Morocco, Portugal, Principe, Rio de Oro, St. Helena, Sao Thome, Sierra Leone, Spanish Sahara, Tangier, Togo Republic, Tristan de Cunha, West African Republic.

The way things are changing, some of the above may have new names and even new times, but the variation would not be more than an hour either way.

I hope that this information, together with the time chart, will be helpful when using the Prediction Charts to decide what area to beam to and call.

*3 Maxwell Street Lalor Vic 3075.

PHILIPS TO MAKE IC's HERE

Plant to manufacture integrated circuits is being set up in Australia by Philips. In Europe, Philips already are well established in the IC field, with quantity production in factories in Holland and Germany, and in U.K. through associated Semiconductor Manufacturers Ltd.

Following the fast development in IC's, Philips, in accordance with established policy, will help keep the Australian electronics industry abreast of world trends, to ensure self reliance in design and engineering for both the defence and domestic markets. Talks in Holland last month resulted in plans being formulated for future expansion of Philips in Australia.

San Francisco*	Montreal* Barbados	Rio de Janeiro	G.M.T.	London*	Jo'berg	Cairo Nairobi	W.A.S.T.	Tokyo	S.A.S.T.	E.A.S.T.
G.M.T. −7	G.M.T. −4	G.M.T. −3		G.M.T. +1	G.M.T. +2	G.M.T. +3	G.M.T. +8	G.M.T. +9	G.M.T. +9½	G.M.T. +10
19	22	23	02	03	04	05	10	11	1130	12
21	24	01	04	05	06	07	12	13	1330	14
23	02	03	06	07	08	09	14	15	1530	16
01	04	05	08	09	10	11	16	17	1730	18
03	06	07	10	11	12	13	18	19	1930	20
05	08	09	12	13	14	15	20	21	2130	22
07	10	11	14	15	16	17	22	23	2330	24
09	12	13	16	17	18	19	24	01	0130	02
11	14	15	18	19	20	21	02	03	0330	04
13	16	17	20	21	22	23	04	05	0530	06
15	18	19	22	23	24	01	06	07	0730	08
17	20	21	24	01	02	03	08	09	0930	10

Time Chart (*Daylight saving during part of the year.)

TRADE REVIEW

THE FL-50 S.S.B. TRANSMITTER

INTRODUCTION

During the past ten years or so Australia has seen the introduction of commercial Amateur equipment being handled in quantity by agents. This has aided an increase in the use of commercially manufactured equipment by Australian Amateurs. Equipment is available from various countries of manufacture, there being several competing with one another.

A relative newcomer to the Australian market, but no newcomer to Amateur equipment design and manufacture is the Japanese Yaesu Musen Company (pronounced Yaysoo Moosen), whose Australian agent is Bail Electronic Services.

Yaesu Musen manufacture Amateur Radio equipment exclusively and they have a wide range of equipment with different capabilities and functions. The equipment reviewed here is one of their lower-cost lines meant for the Amateur on a low budget.

Several units of the FL-50 were made available by the agent. This was done to enable comparisons to be made between the performances of individual units. The FL-50 has been made to compete with the low cost market and sells at $225 including sales tax. A matching v.f.o., the FV-50, is available for full band coverage.

GENERAL DESCRIPTION

As with most equipment, facilities and complexity are directly proportional to price. Thus some facilities that are incorporated in higher priced equipment are not included in this design. An internal v.f.o., v.o.x. and selectable sidebands are not incorporated features of this model. The power capability is also less than higher priced models. But nothing else, it seems, has been sacrificed to lower the price. The rest of the review will affirm this.

The FL-50 is a complete, five-band transmitter for s.s.b., c.w. and a.m. The transmitter has an internal v.x.o. which allows approximately 10 Kc. shift. Crystals are extra by order. The power input to the final is nominally 50w. (d.c.). Sideband generation is by the filter method using a five-crystal lattice filter on 5173.9 Kc. and a carrier crystal on 5172.4 Kc. This gives u.s.b. output. The correct sideband for the band in use is automatically selected by the proper heterodyne frequency in the v.x.o. or external v.f.o. (See block diagram.)

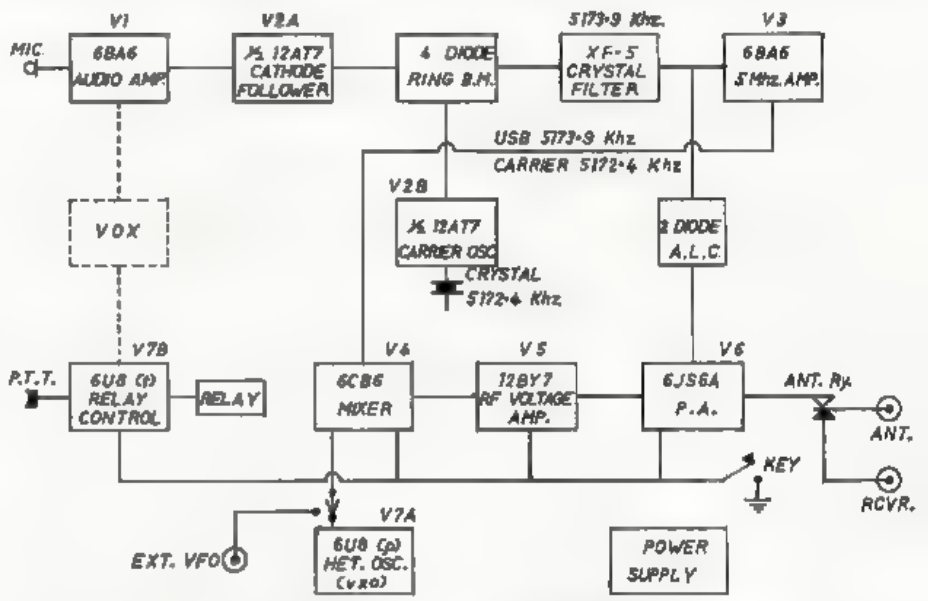
A calibrated meter (and switch) enables the cathode current of the p.a. to be read as well as r.f. output (from diode detector).

Transmitter control is normally p.t.t. via suitable push-button microphone. There is provision on the chassis for including v.o.x. circuitry if so desired.

Internal a.l.c. is taken from the p.a. and applied to the 5 Mc. amplifier (see block diagram). The p.a. uses a single 6JS6A tube.

The carrier level control is a front panel control which enables carrier to be re-inserted at the grid of the 5 Mc. amplifier. Thus the level of carrier can be set to any desired level for tuning, and for a.m. or c.w. operation. Straight or break-in operation is available for c.w. work.

The rear apron has sockets for antenna (SO239) and receiver control, switched by an internal antenna (c/o) relay. Also sockets for FV-50 power and r.f. leads are mounted on rear chassis. The p.a. bias adjustment pot. is also on the rear apron.



BLOCK DIAGRAM OF FL-50 TRANSMITTER

CRYSTAL OR V.F.O. RANGE

3.5 Mc. Band	3,672.4 Kc.	to	3,747.4 Kc.
7 " "	12,172.4 "	"	12,272.4 "
14 " "	8,827.6 "	"	9,177.6 "
21 " "	15,827.6 "	"	16,277.6 "
28 " "	22,827.6 "	"	24,527.6 "

POWER SUPPLY

	Stated	Measured
High Voltage	Plus 500V.	Plus 480V.
Low Voltage	Plus 250V.	Plus 225V.
Regulated	Plus 150V.	Plus 150V.
Regulated	Minus 100V.	Minus 100V.

HANDBOOK TECHNICAL SPECIFICATIONS

Type of Emission: c.w., a.m. and s.s.b. (l.s.b. on 80 and 40 metres, and u.s.b. on 20, 15 and 10 metres).
Operation: Push to talk.
Power input: 50w. d.c.
Output Impedance: 50 to 120 ohms.
Frequency Range: 3.5-3.8 Mc., 7-7.5 Mc., 14-14.5 Mc., 21-21.5 Mc., 28-30 Mc.
Frequency Stability within 0.005%.
Carrier Suppression: —50 db.
Sideband Suppression: —50 db.
Distortion Products: —30 db.
Audio Response: 300 to 2,700 c.p.s., ripple within ±3 db.
Power Requirement: a.c. 100/110/117/200/220/234v., 50/60 c.p.s., approx. 100 vA.
Cabinet Size: 6" x 13" x 10½".
Net Weight: 23 lbs.

V.X.O.

The stability of the crystal used is the main factor here. The handbook gives a 0.005% stability figure but if crystals of greater stability are used (i.e. 0.001%) then this is achieved.

The output frequency of the crystal oscillator, and thus the transmitter, varied slightly between individual units. This was attributed to the fact that different 6U8A tubes have different input capacities coupled with different stray (wiring) capacitance in the different units. It was rarely more than 5 Kc. from the marked crystal frequency

A socket on the front panel facilitates changing of crystals. A switch next to this socket enables an external v.f.o. to be switched in.

The shift attainable with ordinary HC6/U crystals is generally around 10 Kc. A variable capacitor coupled to a large hand-span knob on the front panel facilitates this. Special low capacity crystals are obtainable which enables the frequency to be pulled 20 to 50 Kc. They have to be "tailor-made" though for individual units for reasons given above.

CARRIER AND UNWANTED SIDEBAND SUPPRESSION

One unit was checked, on 21 Mc., and the following figures obtained relative to full power output.

Carrier Suppression.
Switch on, —58 db.
After 15 minutes, —63 db.

Unwanted Sideband:
Switch on, —50 db.
After 15 minutes, —50 db.

The carrier suppression on other units was as good as or only slightly degraded (6-8 db.) from these figures.

The unwanted sideband suppression was as good as this, with minor fluctuations, for other units.

Carrier suppression was measured relative to full power output with audio applied. The carrier suppression was degraded about 4-5 db. with two-tone signal applied.

These figures are very good and show that the handbook specifications are somewhat conservative

Many higher priced transmitters do not claim or attain these figures for carrier and unwanted sideband suppression.

DISTORTION PRODUCTS

All distortion products were more than 36 db. below full output on two-tone test signal. This is very good.

R.F. POWER OUTPUT

The following figures are an average for the units measured:—

80	Metres	62	Watts
40	"	64	"
20	"	62	"
15	"	57	"
10	"	56	"

Average p.e.p. output = 60.2 watts.

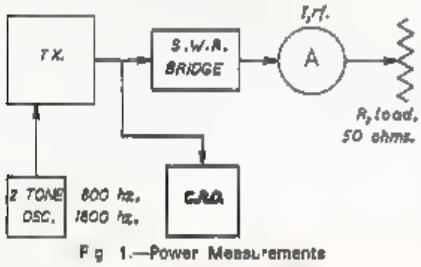


Fig 1.—Power Measurements

The single 6JS6A p.a. appears to be doing a good job. It appears to be operating in class AB2 and measurements indicate that the anode efficiency is around 60 to 65%.

This indicates a well-designed p.a. and efficiently constructed tank circuit.

Power output was measured as shown in Fig. 1.

The method used was:

(1) Transmitter tuned up as per the handbook.
(2) Two-tone oscillator then applied.
(3) Tuning touched up.
(4) Two-tone level adjusted so that pattern on c.r.o. is not quite flat-topping.
(5) Measurement of I_{RF} then taken.
(6) Calculate Pm:

$$Pm = I_{RF} \times R_L$$

(7) Calculate p.e.p.:

$$\text{p.e.p. out} = 2\ Pm.$$

OVERALL FREQUENCY RESPONSE

This was measured by applying an accurate audio oscillator to the mic. input and setting the transmitter to maximum output with a 1 Kc. signal applied to the audio. The output of the transmitter was then measured and subsequent readings referred to this.

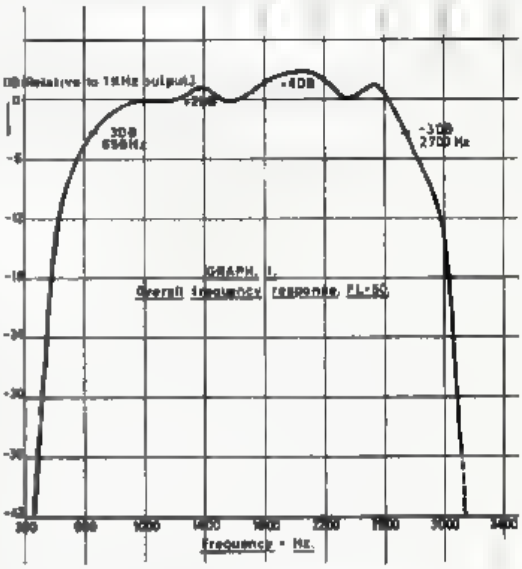
The results are shown in Graph 1 for one unit that was measured. It can be seen that the response "rolls off" a little sooner than expected on the low frequency side as the —3 db. point is at 650 c.p.s. rather than around 300 c.p.s. as mentioned in the handbook specifications. This may be owing to the carrier crystal being a little low in frequency.

The upper —3 db. point is at 2700 c.p.s. as per the handbook.

The ripple is well within ±3 db. as mentioned in the handbook specifications (i.e. 6 db. peak-to-trough). In this case, the ripple is only 4 db. peak-to-trough or ±2 db. ripple.

The bandwidth is a little narrower than expected, but is nevertheless very good. On-the-air reports give "good quality", "easy to resolve" to "excellent".

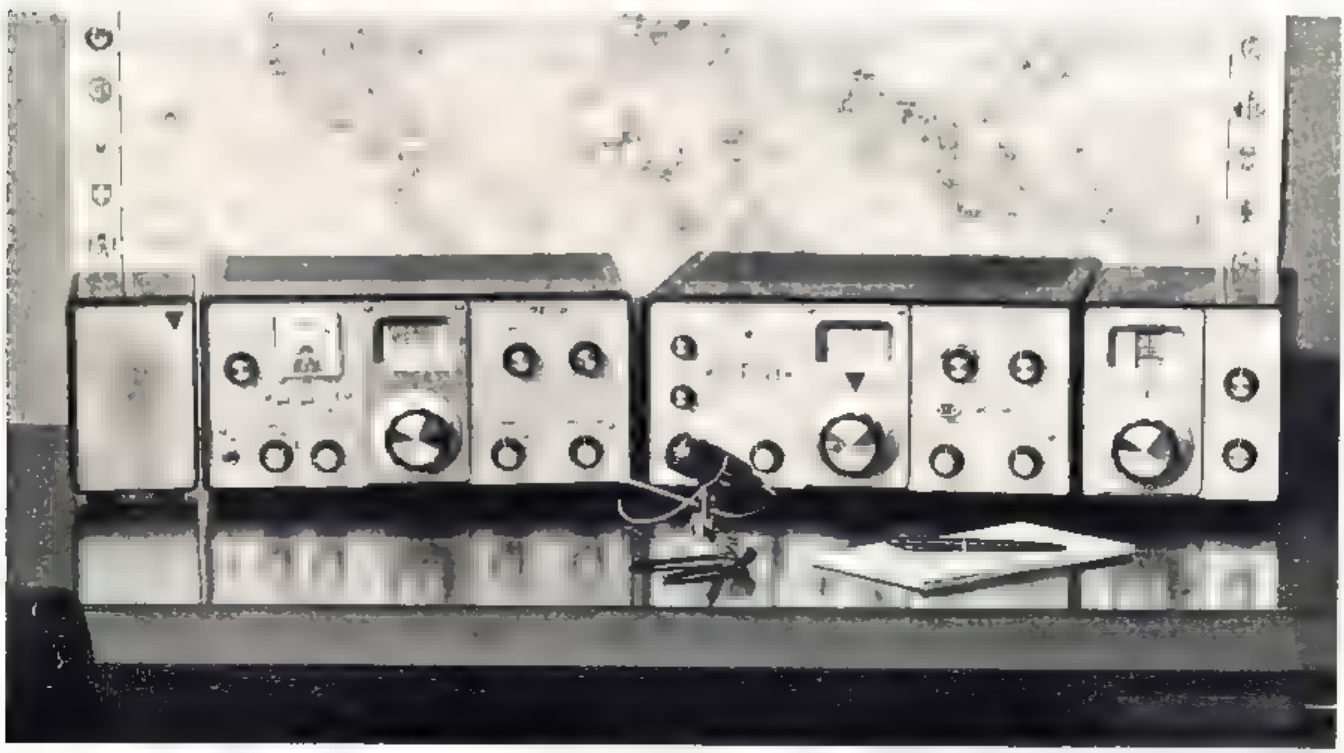
These results indicate a well designed and constructed crystal filter.



T.V.I.

It appears that this little rig does not radiate spurious signals which are sufficiently strong to cause t.v.i.! Need I say more?

The FL-50 is a straightforward, single conversion design and, as such, reduces the possibilities of spurious output signals to a minimum.



The Yaesu Musen "50" Series (left to right): SP-50 Speaker, FR-50 Receiver, FL-50 Transmitter, and FV-50 VFO

POWER SUPPLY

The power supply is in-built on the same chassis so that a completely self-contained unit results. This appears to be a feature with all Yaesu equipment.

One transformer provides all the necessary voltages. The a.c. input is nominally 234v. for Australian conditions, but other taps are available to provide 100/110/117/200/220 volts at 50 or 60 c.p.s. The power drain on the mains is approximately 100 watts.

The rectifiers are all solid state and adequate protection is provided. Both transient and surge suppression components are included.

A regulated 150 volts is supplied from a gas tube regulator for the oscillators and p.a. screen.

A neon regulates the bias supply and also serves as an "on-air" indicator.

All the filter capacitors have about a 1.7 times safety factor on the voltage rating. The amount of capacitance used ensures low ripple content.

The choke used is also of adequate proportions. The regulation of the main h.t. is very good, being approximately 8%. When the key is up the p.a. h.t. is 480 volts, with key down and full power output, this drops to 440 volts. The drop is about half this on speech peaks.

After some considerable time of operation the power transformer is warm to the touch but not hot.

All in all, it appears that the power supply has been well designed and is of adequate proportions.

The main h.t. can be halved by a very simple modification to bring the h.t. down to about 250v. The transmitter may then meet the requirements for low power operation if required for special cases. The agent will perform the modification upon request.

CONSTRUCTION

I was very impressed with the construction of these uits. The layout is neat and logical. The wiring is very neat and looms are used for the long runs of wiring. All the components are mounted on tag-strips or socket lugs and are at right angles to a chassis wall and parallel to the bottom.

All components are easily accessible and readily identifiable. The valves are clearly marked on the chassis. The chassis is punched steel which has been cad-plated, passivated and lacquered.

The tank coil is a large (1¼") diameter ceramic former with heavy gauge plated copper wire wound on it. It is mounted well clear of the chassis on two stand-offs. The bandswitch has ceramic p.a. sections. All this ensures high efficiency in the tank circuit.

The front panel is satin finished aluminium and the layout of the controls is balanced and pleasing. The front panel could do with some brackets behind it for support, although wiggling it around during transmitter operation has no effect. It doesn't wiggle much anyway.

The sideband generator is mounted on a printed circuit board. This board ("F" type s.s.b. generator) is available separately for those who wish to roll their own.

The overall construction is very robust and very neat. Yaesu are to be commended on this point.

ON THE AIR

The unit is very easy to use. Tuning and loading is smooth and not critical on all bands. The rig can be tuned in a minute or less. The audio gain is ample for quite a number of different high impedance mikes.

The carrier control is also very smooth and easy to adjust, as is the bias control on the rear apron.

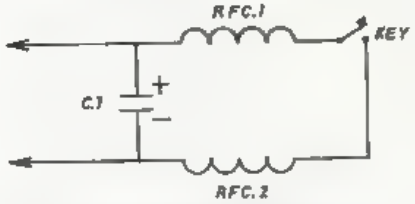


Fig. 2.—Suggested Keying Filter.
C1—2-8 uF. 350v.w. electrolytic.
RFC1, RFC2—Aegis Type C4.

The small switches are easy to operate with one finger and once switched, **cannot be knocked** into alternate position.

Audio quality reports are consistent for different units and very encouraging. For example, "very natural", "easy to resolve", "very good" and even an "excellent".

A.m. quality is reasonable but not as good as a proper a.m. transmitter because only one sideband and carrier are transmitted by the FL-50 on a.m. (usual system with most s.s.b. rigs).

Fig. 3.—Keying Waveform of FL-50.

With a key with no filtering, the keying characteristics tend to show "clicks" and "thumps". The agent attaches some supplementary operating notes to each handbook and a filter is suggested in these notes. Fig. 2 is taken from these notes and gives the envelope as seen on a c.r.o. (Fig. 3). This gives an excellent character. No chirp is evident on the transmission either.

The type of keying used is grid bias keying; the keyed stages being the r.f. stages.

THE HANDBOOK

The handbook is well presented and includes a very clear description of the circuit operation. All the information necessary for alignment and trouble shooting is included as well as a very comprehensive voltage chart.

A large, clear, easy to read circuit diagram is included, along with circuit diagrams for the crystal filter and v.o.x., with or without anti-trip. The crystal filter curve is also supplied.

The agent has included two pages of supplementary notes. One page is all about the FV-50 remote v.f.o. The other page gives more detailed operating information and hints.

No list of mechanical parts is included nor installation information. This, though, is a minor point.

Unfortunately, it is not a printing but a dyeline copy type, but is nevertheless clear and easy to read.

THE GUARANTEE

There is a 90-day guarantee on components and workmanship excepting valves. (Receiving valves used in transmitters are not normally guaranteed), the usual provisions apply regarding transport charges and misuse. Incidentally, spares for all valves, including the 6JS6A, along with just about anything else are available from the agent. He also does pre-sales inspections and servicing as well as after sales service. Included in this is the installation of a 3-core a.c. power cable and plug to replace the 2-core cable originally fitted.

CONCLUSIONS

At $225, this little transmitter is a bargain. There has been no corner cutting or skimping on component tolerances in this design. Robust construction and careful circuit design makes for an efficient little rig. It has circuit features that are included in many higher priced rigs and a quality to equal them.

I feel that the lack of v.o.x. facilities will not be missed as many operators prefer push-to-talk operation. But if you wish for v.o.x. then it can be easily installed. (A suggested circuit is included in the handbook.)

From Table 1 it can be seen that the handbook specifications are generally equalled or exceeded.

One rarely sees such robust construction and generous design in low cost Amateur equipment. Along with that, the performance is excellent and the Yaesu Company should be commended for this.

Specification	Handbook	Measurement
Stability	within 0.005%	Depends on Crystal
Carrier Suppression	—50 db.	—63 db.
Sideband Suppression	—50 db.	—50 db.
Distortion Products	—30 db.	—36 db. or greater
Audio Response	300 to 2700 c.p.s. ±3 db. ripple	350 to 2700 c.p.s. ±2 db. ripple
Power Input	50 watts d.c.	52 watts (average) d.c.

Table 1.

A NEW FIELD-DAY V.H.F. BEAM

COL HARVEY, VK1AU*

Since the advent of t.v. and rabbit ears, some of us have wondered why the movement of homo sapiens near the installation has produced such effects as enhancement of the picture; loss of synchronisation; and ghosting. Could it be that our human friend was metallic? Or as some unkind critics of Amateurs might contend, di-electric from the tummy up? And why is that pussy-on-the-window sill and pluto-on-the-mat seem not to display the effects so readily demonstrable by their two-legged masters?

The National Capital provides an unique opportunity to demonstrate these effects, since Big Brother frowns on t.v. aerial arrays outside, and because the two local t.v. stations pour volts of r.f. into the Territory. What's more, with Channels 3 and 7 available, some interesting comparisons can be made, using the lounge room as an antenna range!

By locating the rabbits ears on a flower pot in the centre of the room, it is possible to stand in a position which is the equivalent of either a director or a reflector. Observation of the t.v. set picture, via a strategically placed mirror, will show that by standing at a relatively critical distance from the rabbits ears, the t.v. signal is significantly and even drastically altered. What's more, the position at which this effect occurs is different on Channel 3 to what it is on Channel 7. What gives? Obviously homo sapiens is an antenna element! But what is his resonant frequency?

So far as I can deduce, Fr. H.S. is not greatly affected by the distance between ears and toes, nor does his circumference seem to have a bearing on his resonant frequency. Simple substitution of the OM, for the XYL and then the first and second operators, seems to show that a similar effect is attributable to all available sizes. Furthermore, the effects seemed to be strongest on Channel 3 if the human antenna element is placed between the t.v. receiving antenna and the t.v. station.

Deduction 1: Homo sapiens is "resonant" at a frequency somewhat higher than Channel 3.

Repeating the performance on Channel 7 transmissions (which with restless assistants is not as easy as it sounds!!!) produced results which suggest that a stronger variation occurs when the human "element" is positioned on the opposite side of the t.v. receiving antenna to the t.v. station!

Deduction 2: Homo sapiens is "resonant" at a frequency lower than Channel 7. Ergo, he must therefore be capable of being used as a reflector element on the 2 metre band, and probably as a director on 6 metres!

I leave it to others to decide how much power our friend will tolerate before letting off steam, and to decide just how to keep our hero rooted to the right spot during a long transmission.

Despite such problems, there is no doubt that the human body can significantly affect the field pattern of v.h.f. antennas. Since the body is also a conductor, presumably r.f. currents are coupled into it from any nearby radiator, and it will re-radiate in typical antenna fashion—even though it has poor efficiency and is broad band, due to its circumference.

Presumably, the presence of a nearby human element would therefore also affect antenna impedance and standing wave ratio. In practice, most of us have observed variations in field strength and s.w.r. whilst engaged in adjustments of driven elements, which seems to further confirm the concept. I don't go so far as to suggest link coupling the XYL to a kilowatt whilst pointing her mid-ships interstate. What I do suggest is to try with low power, vertically polarised equipment to determine whether or not a useful change from the normally circular polar diagram can be achieved by using Mum as a reflector and a string of Junior Ops. in descending order of age, as vertical directors! Providing the house is big enough and your assistants will co-operate, you could also experiment with horizontal polarised human beams.

Rough lounge-room experiments suggest that the human director is worth many db. in front-to-back ratio. For example, a really solid t.v. signal can be made almost unusable, by introducing an appropriately located human director/reflector.

If the same thing can be made to occur with portable transistorised 2 metre equipment, some marginal contacts might be made "solid" simply by correctly positioning a couple of assistants in the desired direction of transmission or reception! Results of tests direct to "Amateur Radio," please.

One word of advice to intending experimenters, if you want to retain your XYL as an assistant long enough to reach any conclusions, don't refer to her as a "thick unipole' when she stands in the wrong place, or moves away from it before you complete your field strength measurements.

POST-SCRIPT

An experienced but young bachelor engineer to whom the above text was referred immediately saw possibilities never dreamed of by the author. He suggested that human resonance effects might also explain the well known flower people phenomena seen regularly during the British summer in Hyde Park, apparently whenever Radio Caroline is on the air.

Casting around for a means to create similar effects at will in the National Capital, he almost gave up when he realised that the many knowledgable fathers of the delectable Young Things in Canberra could thwart his efforts simply by de-tuning their daughters, perhaps with a simple belt of aluminium foil. Nevertheless, our hopeful engineer is often to be seen in the Mall on Friday nights, furiously raising and lowering his hat (in which there is a halo-like shorted turn) as each D.Y.T. passes him by.

As his activities so far have resulted only in brief encounters with very senior members of the Fat and Over Fifty Club, he is beginning to wonder whether or not some of his colleagues with access to Radio Belconnen, are sabotaging his experiments by inducing well timed bursts of low frequency r.f., which mask the more delicate v.h.f. resonances which he is seeking so assiduously.

* 16 Leane St., Hughes, A.C.T., 2605.

SIDEBAND ELECTRONICS ENGINEERING

As so frequently the case, not all news is good news. The recent 15% sales tax rate on tranamitting equipment will add $10 to $15 to every new transceiver—we shall just have to pay up. On items in stock since before the increase, I have already paid what there is to be paid, so there the old prices still apply. New imports will just become dearer and in many cases not only because of the higher sales tax rate. Prices overseas are also rising, a TH6DX Hy-Gain Beam was $140 in the U.S.A. some 18 month ago; the equivalent TH6DXX, electrically the same with just a different boom to mast clamp, now costs $US160.

When my stock of HEATH Kits is sold out I shall have to drop that line, there is no joy in it. HEATH does not extend discounts to dealers, nor exports directly to me, so what I buy from them costs me just as much or even more than to everybody else who orders a single kit in one way or other. Sorry, I cannot continue to tie up money in stocks and then have to decide to sell them at a loss in order to make them move.

But there is also good news. The new GALAXY V. Mk. III. will soon be in stock and for its price range offers more than any other set of its type. Conservative 500 watt PEP input, the smallest powerhouse on the market!

Am also going to add MOSLEY Beams to my range of brands. So if you have planned a TH33Jr, wait a little longer till they have arrived and shall be available for less than $100—yes, all charges included. All my prices include sales tax, but no power supplies with transceivers, unless specifically mentioned.

Those who have missed the September 1968 issue of "Amateur Radio" should take a good look at the cover picture and the story on its pages 9 and 10! At last an Australian manufacturer is going to make Amateur equipment and not just a transceiver and power supplies only. The full ACITRON line, planned by A.C.I. Technical Centre Ltd., subsidiary of AUSTRALIAN CONSOLIDATED INDUSTRIES, will consist of:

All-band SSB transceiver.
AC and DC power supply units for that transceiver.
External VFO for it, range 5.0 to 5.5 Mc.
Linear amplifier unit.
A combination dummy-load, watt-meter, two-tone oscillator and 400w. p.e.p. output limit indicator unit.
Johnson-type antenna feedline matchbox.

So at last, in 1969, Australian made first class Amateur equipment with a domestic service organisation, the best news so far.

Herewith a listing of my current prices. In the Japanese lines, I have added the TRIO transceivers and receivers, imported and priced correctly by Western Electronics. As to the YAESU-MUSEN, I hope to do even better in future. The FT-DX400 retails for approximately $A300 in Japan, so with now 71% total in import duties and sales tax, plus freight, insurance and handling charges, a total cost of $A600 leaves just enough margin for my profit mark-up. There certainly is a different ratio on overseas retail costs and what I sell them for on most American transceivers; for instance, SWAN 350C and GALAXY V. Mk. III. $US420 or approx. $A380 against $A550 selling prices here! 73, Arie Bles.

GALAXY V. Mk. III.	$550
SWAN SW500C	$690
GONSET 2M Sidewinder	$350
TRIO TS-500	$488
HY-GAIN TH6DXX 10/15/20 mx six element Beam with BN-86 Balun	$200
HY-GAIN TH3JR Junior Beam	$105
MOSLEY TA33Jr (in November)	$98
WEBSTER Bandspanner, 10 to 80 mx Mobile Whip with ball mounting and spring ..	$55
SWAN 350C	$550
SWAN SW250	$425
YAESU MUSEN FT-400DX	$600
NEWTRONICS 4-BTV 10 to 40 mx Vertical	$55
With 80 mx top-loading coil	$65
HEATH HA-14 Linear Kit	$150
MARK 10/15/20 mx Tri-band Helical Mobile Whip, the latest!	$25
MARK 40 mx Helical Whip	$15
EIMAC 3-500Z zero-bias Triodes	$38

Spare Valves in Stock for all types of U.S.A. Transceivers

SIDEBAND ELECTRONICS ENGINEERING

P.O. BOX 23, SPRINGWOOD, N.S.W., 2777 Telephone: **Springwood** 511-394

The Most Outstanding Transceiver Value Ever Offered the Amateur!

Now Even Better Than Ever!

THE NEW

GALAXY V. Mk. III.

SIX GREAT NEW FEATURES!

- ★ NEW PRECISE VERNIER LOGGING SCALE
- ★ NEW 500 WATT SSB POWER
- ★ NEW SOLID STATE VFO
- ★ NEW CW SIDETONE AUDIO
- ★ NEW CW BREAK-IN
- ★ NEW CW FILTER

PLUS THE SAME FEATURES THAT PUT THE GALAXY V. IN A CLASS BY ITSELF!

- **Smallest 500 watt transceiver** (6" x 10¼" x 11¼"). Makes it the best mobile and fixed station transceiver!
- **Coverage:** 80, 40, 20, 15 and 10 Metres.
- **Selectable sideband** (USB or LSB). Built-in, and no frequency jump changing sidebands, as with others!
- **Best filter available today** (2.1 Kc. with 1.8:1 shape factor).
- **Stable suppression** (45 db. carrier and 55 db. unwanted sideband without need of a panel control and constant adjustment) **hottest receiver—bar none!**
- **Highest sensitivity**—better than ½ uV. for 10 db S+N/N!
- **Break-in** (with VOX accessory). CW with adjustable delay!
- **Automatic sidetone generation on CW!**
- **Shifted carrier CW** (prevents "leap-frogging"!)
- **ALC protection** and "talk-power"!
- **New hybrid circuitry** with solid state VFO, AVC, VOX, audio!
- **Outstanding audio derived AVC** "virtually block-proof"!
- **New CW filter accessory for 300 c.p.s. bandwidth** (the only transceiver with this feature at any price!)
- **Dual vernier tuning** (12:1 fast tune or 72:1 slow tune!)
- **Extremely high stability** with drift less than 100 c.p.s. in any 15-minute period after warm-up!
- **E-Z view VFO dial**—most convenient mobiling!
- **New styling** with an improved, wrap-around, perforated, antique black cabinet. More rugged and lowered component heating. Also, attractive, 4-color brushed aluminium panel.
- **Plus the most comprehensive line of matching accessories** in any product line with a transceiver.

SPECIFICATIONS

FREQUENCY COVERAGE 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-29.0* Mc. (*Optional crystals for other 1 Mc. ranges.)

SOLID STATE VFO Tunes 5.0-5.5 Mc. at all times without any switching for best stability, and doubly temperature compensated and voltage regulated.

GENERATION SCHEME 5.0-5.5 Mc. VFO mixed with 9 Mc. filter oscillator for 80 and 20 metre operation, using sum-difference selection. 40-15-10 metre operation by pre-mixing VFO with correct crystal controlled oscillator, then into 9 Mc. IF system.

TUNING Illuminated, two-color dial scale system with adjustable hairline fiducial. Two speed vernier reduction system of 12:1 allows fast tuning and 72:1 slow-precise tuning. Also includes new precise dial logging calibration on tuning knob with adjustable hairline fiducial for high resetability resolution. Primary calibration 5 Kc. markers with 100 logging scale divisions each revolution of knob. Over eight linear inches of dial calibration.

STABILITY New solid state VFO circuit has double temperature compensation and double voltage regulation for utmost stability. Drift is less than 100 c.p.s. in any 15 minute period after nominal warm-up; less than 100 c.p.s. change for 10% change of primary voltage on our power supplies.

CONTROLS (1) Main VFO dial, illuminated; (2) A.F. gain; (3) R.F. gain; (4) Mic. gain; (5) Exciter tuning, (6) P.A. plate tuning; (7) Bandswitch; (8) Load control, (9) Sideband selector; (10) Function selector—PTT, VOX, CAL., TUNE, CW. Rear Final bias set. Inside. "S" meter zero, VOX (if accessory installed), Gain, Anti-VOX, Delay.

TRANSMITTER SSB 500 watts p.e.p. input, manual keying for SSB or CW, and also automatic "break-in" keying with VOX accessory on phone or CW; generating audio sidetone into speaker at all times in tune or CW functions, selectable sideband operation with illuminated USB-LSB indicators, showing SB in use, shifted carrier CW operation to minimise "leap-frogging" shaped grid-block keying on CW to suppress clicks and chirps, carrier suppression of 45 db or more without frequent re-adjustment, unwanted sideband suppression of 55 db without frequent re-adjustment, bandpass of 2.1 Kc. nominal with 1.8:1 shape factor and nominal response of —6 db. at 300 and 2400 c.p.s.; ALC control for maximum "talk-power" without "flat-topping". Tune position for reduced power adjustment and longest tube life; high impedance microphone circuit (microphones should have —50 to —60 db. output for best results) with PTT control, adjustable pi-network output matching nominal 50 ohms and 40-100 ohm resistive range, compact size 6 in. high, 10¼ in. wide, 11¼ in. deep and 13 lbs. net weight.

RECEIVER Coverage same as transmitting, pre-selection coupled with exciter tuning control and does not require separate adjustment; sensitivity better than ½ uV. for 10 db. S plus N/N, selectivity nominal 2.1 Kc. with internal six-crystal lattice filter (or may be reduced to nominal 300 c.p.s. with optional filter—peaked at nominal 800 c.p.s.), full AGC on received modes with fast attack, slow release, and less than 6 db. output change for 80 db. input variation, using audio derived system, nominal antenna input impedance of 50 ohms; audio response -6 db. at 300 and 2400 c.p.s. points, audio output impedance 8 ohms; audio power output 1 watt nominal.

SIDEBAND ELECTRONICS ENGINEERING

P.O. BOX 23, SPRINGWOOD, N.S.W., 2777 Telephone: **Springwood** 511-394

A SIMPLE HIGH PERFORMANCE 6 METRE CONVERTER

RODNEY D. CHAMPNESS, VK3UG (Ex VK0CR)*

IN this day and age of transistors here, there and everywhere, a valve type v.h.f. converter may seem obsolete to some. Many people, however, are much happier using valved equipment and building same. Having been brought up on a diet of valves from an early age, I think in terms of valved equipment and then transistors.

The converter has an r.f. stage followed by a mixer stage which has oscillator injection from a crystal controlled oscillator. As indicated by the heading, this is a simple converter and uses only two valves. One feature not often found is the inclusion of a.v.c. to the r.f. stage. The 6EH7 is used in the r.f. stage because of its remote cut-off characteristics, high gain and lower noise compared to the much used 6AK5.

One triode of the 12AT7 is used as a Squier type overtone oscillator on a frequency of 45 megacycles, which is coupled by a small value capacitor to the grid of the other 12AT7 triode which functions as the mixer. Triode mixers are quieter than pentode mixers. It will be observed that the two sections of the 12AT7 are connected in series as far as d.c. is concerned to conserve h.t. current.

The placement of coils and valves more or less follows in a straight line, much as indicated in the schematic diagram. The oscillator coil and crystal are mounted close to the 12AT7. There is no need to crowd any components. The 6EH7 valve socket is placed so the input faces the aerial coil L1 and the output faces the r.f. coil L2. A small tinplate shield, sufficiently big to shield the 6EH7 input and output and the coils, should be soldered across the valve socket earthing pin 4, the centre spigot and going between pin 1 and pin 9. The coils are all mounted below the chassis. All earth points for each stage to be earthed as near the one spot as possible.

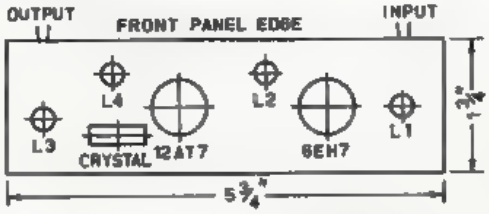


DIAGRAM 2

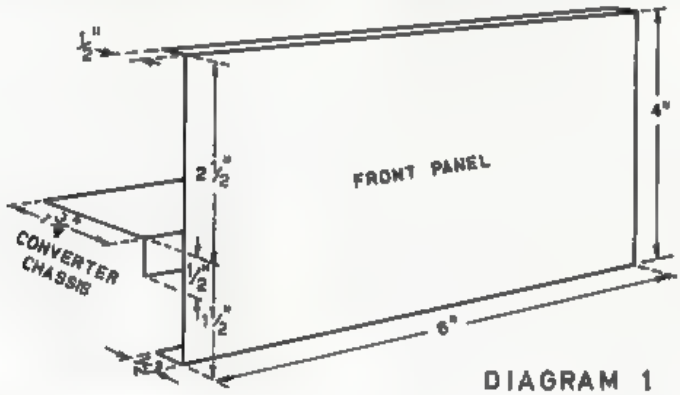


DIAGRAM 1

Wire the stages as per schematic diagram. The capacitors across L1, L2 and L4 are all gimmick capacitors made up out of thin walled single conductor insulated hook-up wire or possibly bell wire. The 2 pF. capacitor from the plate of the oscillator to the grid of the mixer is made in the same way. No more than about 1½" of twisted wire should be needed for any of these gimmick capacitors. Adjust these gimmicks until the coils tune to the desired part of the band as indicated by a g.d.o. with slugs half way in the coil, with the exception of L4 which is adjusted so that maximum output of the oscillator occurs with about half the core inside the coil.

These coils are all high Q, so we get high gain but not much bandwidth; the bandwidth is only about 1 to 1.5 megacycles with high gain, but this should be adequate in most cases. If lower Q is desired and wider bandwidth, fewer turns of wire on each coil with increased parallel capacity will be satisfactory. L4 doesn't affect the bandwidth, so is okay as is. Coil L3 is made broadly resonant at 8 megacycles and has a resistor wired across it to broaden its bandwidth. A normal 6-18 megacycle valve type aerial coil connected back to front would be ideal in this position. L5 is the low impedance aerial input coil. If high impedance output is desired, an r.f. choke in place of the 8 megacycle coil would be okay.

The unit is ready to try out, first making sure that the wiring is all correct. Apply power and connect to a receiver. Adjust the oscillator for maximum output by using your g.d.o. as an absorption wavemeter; this will also ensure that the oscillator is on the correct frequency.

Check and adjust the plate to cathode voltage of the oscillator so that it does not exceed 100 volts or oscillator drift will most likely be evident due to heating of the crystal. Increasing the

Now to a more detailed description of the converter starting with the metal work. The converter is quite small, being built into a 6" x 4" x 2" chassis which is in fact the converter case. A 6" x 5" sheet of aluminium or galvanised iron sheet has two right angle lips each of approximately ½" made along the 6" sides, so making a cover which will fit over the open side of the 6" x 4" chassis.

A small chassis is made out of sheet aluminium or sheet galvanised iron, measuring 2½" x 5¾". Along one of the 5¾" edges a ½" right angle lip is made so that the small chassis can be bolted to the 6" x 4" chassis cover. The small chassis (on which the actual converter is built) is attached to the cover so that there is a 2½" clearance on one side to allow for the height of the 6EH7 valve, see the diagrams for more details. This is the chassis made up now to the placement of major components.

* 24 O'Dowds Rd., Warragul, Vic., 3820.

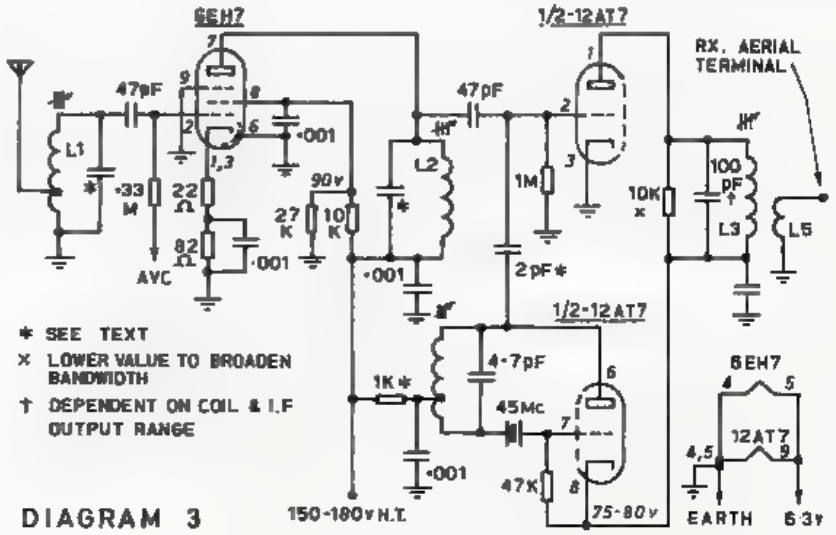


DIAGRAM 3

1,000 ohm resistor will give the desired result. A v.h.f. type crystal is used in this circuit and does not require much feedback to maintain oscillation. The amount of feedback is controlled by the position of the tap on L4.

Now check that the screen voltage on the 6EH7 is not higher than 90 volts; adjust if necessary.

With the oscillator going on 45 megacycles, inject a signal on about 53 megacycles or at your favourite centre frequency, at a millivolt or so, even as high as a 100 millivolts may be necessary if the coils are way off tune. Tune the i.f. receiver until the signal is picked up, then reduce the signal input level to a weak but useable level, or to a level of say S3 or 4 on the S meter. Now peak L1, L2, L3 for maximum signal output, or maximum S meter reading, reducing the signal level input to keep the S meter reading below S9.

Now alter the oscillator coupling capacitor for optimum injection for best signal-to-noise ratio on a weak signal. To get the best out of the converter, the tap on coil L1 is adjusted with the normal aerial in use, listening to a weak but steady signal and adjusting for best signal-to-noise ratio. Usually a tapping about 1 turn from the earthy end is fairly right.

If a.v.c. is not required, earth the bottom end of the 0.33 megohm grid resistor on the 6EH7. When using a.v.c. limit the control voltage to —20 volts, and the use of delayed a.v.c. to the 6EH7 is desirable for weak signal reception.

COIL DATA

L1—10 turns ⅛" long, wound on 5/16" slug-tuned former, tapped at about 1 turn from the earth end.

L2—9 turns ⅛" long, wound on 5/16" slug-tuned former.

L3—Tuned to resonate at appropriate i.f. frequency with about 10 turns insulated wire overwound on it to form L5. See text.

L4—12 turns ¼" long, wound on 5/16" slug-tuned former, tapped at the 2nd or 3rd turn from the grid end of the winding. Tap position optimum which gives stable output with minimum feedback.

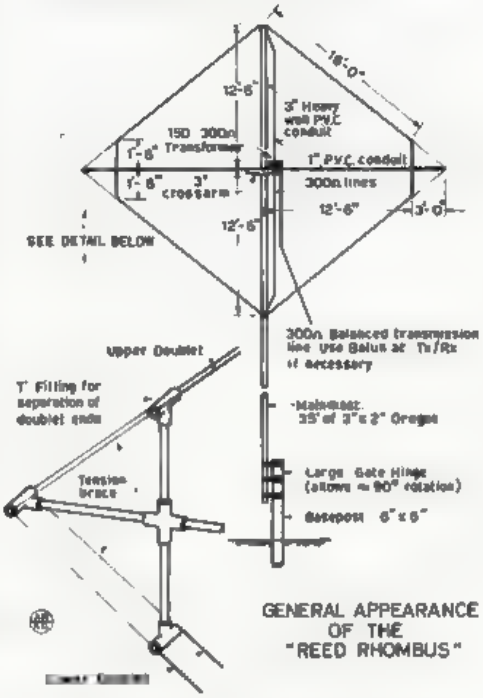
All coils with the exception of L3 and L5 are wound with 20 to 22 B. & S. bare tinned or enamelled copper wire.

That is all there is to the converter, a simple high performance unit which is quite stable and easy to get going and one that should give good performance for quite a long time. If anyone has queries on this converter I will do my best to answer them if a s.a.e. is enclosed with the queries.

Good luck and good listening on 6!

THE "REED RHOMBUS"—A LOW ANGLE ANTENNA

Named from the quadrilateral or rhombus formation of doublets, it consists of two 14 Mc. folded doublets in parallel formed in two "V" formations as shown in the diagram. 3" and 1" P.V.C. heavy wall electrical conduit, together with appropriate "T" fittings, is used to support the doublets. The horizontal arms are cross braced for rigidity. 21 and 28 Mc. doublets may be wound spider web fashion inside and parallel connected to the same ferrite matching transformer.



GENERAL APPEARANCE OF THE "REED RHOMBUS"

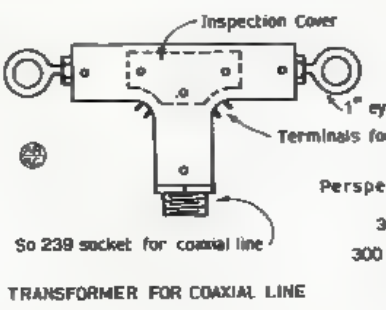
Being of dipole form, no earth radials are required in the system. The antenna gives a figure 8 radiation pattern with lobes of approx. 45°. This, together with a 90° swing supplied by a large gate hinge on the base post, allows 360° coverage.

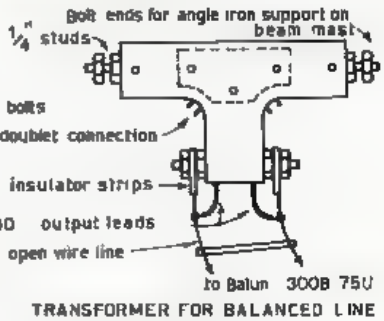
The use of a reflector is not worth the mechanical complication involved as even with 100% reflection there will only be a 3 db. signal gain which is negligible. A greater height, which would be more effective in lowering the radiation angle for DX, is negated by the extra weight necessary to produce this height.

The 300 ohm balanced transmission line could be replaced with either 90 ohm Telcon K18M balanced line or 75 ohm co-axial cable with appropriate matching transformer on cross arm.

The VK2JR ferrite core transformer is housed in a P.V.C. "T" wiring housing (Clipsal 1¼" type) which will allow various methods of feeding and mounting. See diagrams Output windings are wound to suit impedance of radiator type. 75 and 25 ohm for three-band multi wire doublets of 80-40-20 metres. Power rating, 250 watts A3 from 3 to 30 Mc.

—J. G. Reed, VK2JR.





VK2JR FERRITE CORE TRANSFORMER HOUSING

☆

COMPONENTS AND EQUIPMENT CATALOGUE

Featured inside the pages of this October issue of "A.R." is the new 1968-69 component and equipment catalogue produced by Melbourne electronic spares wholesalers, Radio Parts Pty. Ltd. Available on subscription, the catalogue is spiral bound in a handsome cover containing 370 pages showing retail and trade prices, and is profusely illustrated with many new products.

For many years Radio Parts' catalogue has been widely accepted throughout the electronic industry as an authoritative reference book and guide to components currently available in Australia and it should find ready recognition by Amateurs everywhere.

☆

PROVISIONAL SUNSPOT NUMBERS FOR JULY 1968

Dependent on observations at Zurich Observatory and its stations in Locarno and Arosa.

Day	R	Day	R
1	55	16	149
2	37	17	117
3	30	18	96
4	26	19	102
5	28	20	93
6	41	21	93
7	54	22	88
8	89	23	82
9	91	24	101
10	99	25	120
11	124	26	134
12	152	27	131
13	151	28	118
14	147	29	128
15	123	30	115
		31	93

Mean equals 97.3.

Smoothed Mean for January, 1968: 102.2.

Predictions of the Smoothed Monthly Sunspot Numbers

August	109	November	104
September	108	December	102
October	108	January	100

Swiss Federal Observatory, Zurich.

Changes for Mobile Radiotelephone Services

Licensees of V.H.F. land and harbour mobile radiotelephone services, now operating in 30 kc/s channelling areas, are advised that if they have not already installed equipment which meets the Australian Post Office 30 kc/s channelling specification, they must do so before 30 June, 1969.

This requirement has been brought about by the growing demand for V.H.F. mobile radiotelephone services in city areas which is taxing the existing channels available. The change to 30 kc/s channelling will enable more radiotelephone services to be brought into operation as they are required.

However, some changes to existing equipment will be necessary and the following programme for conversion, which is designed to cause the least inconvenience to all concerned, has been adopted:—

As from 30 June, 1969, licensees of V.H.F. mobile radiotelephone services operating in 30 kc/s channelling areas within the frequency bands 70-85 Mc/s and 156-174 Mc/s* will be required to make necessary changes so that:—

(i) All base station transmitter/receivers (both amplitude and angle modulated) employed in a base station installation shall be of a type complying with the relative Post Office specification and approved for 30 kc/s operation and shall be operated in accordance with the terms of that specification.

(ii) All angle modulated mobile transmitters shall be adjusted to function with a maximum deviation of ±5 kc/s.

*This excludes the International Maritime Mobile V.H.F. Radiotelephone and the existing Australian Post Office Subscriber Services.

Early conversion will assist manufacturers in meeting delivery dates for equipment.

FURTHER DETAILS MAY BE OBTAINED FROM THE SUPERINTENDENT, RADIO BRANCH, G.P.O., IN YOUR CAPITAL CITY.

AUSTRALIAN POST OFFICE

Antennas and Animals

I was very complacent about my knowledge of cows until I put up a couple of 80 metre Rhombics over their heads. Not that the actual erection worried them, it was just the inherent streak of perversity that makes cows appear in places where they know you don't want them to be.

These antennas were strung from a hill about 300 feet high and about 2,000 feet distant. The real trouble came later in the life of the Rhombics. A sapling mast snapped off at the top, letting the wire down. Fifty cows noticed it and, after due investigation, camped right there.

When I came along later I cautiously lowered the pole, re-attached the wire, then, waiting till no cows were over the wire, I pushed the pole up. One cow had her head over the wire as it came up, but I naturally expected her to back off. No such luck. The harder I pushed and grunted, the more she enjoyed the tickling of the wire on her throat. If that wire had carried my voice vibrations it would have raised blisters on her. Now this particular herd is allergic to Rhombics, due to a slight misunderstanding on a former occasion. At that time I put fifty cows over a 2,000 ft. length of wire that dangled a foot or so off the ground.

All went well as the leaders stepped over it, but others went under at the same time. The wire was dragged forward and tighter as some tried to jump it as others went under. It vibrated like a violin string. I had two separate 20 ft. poles at one end, only one of them attached to this wire. This pole swung out and back, clouting the stationary pole in time with the more violent vibrations. I could see those big and little waves travelling right to the top of the hill.

Now my blue cattle dog knows only one cure for all exciting events and he diligently applied his cure to all lagging heels. With bitten cows and also cows caught up in the wire all voicing their fears, I felt compelled myself to add to the din so I lifted up my voice and told all the neighbours just what I was going to do to that dog when I caught him. During this period, I was the owner of a very astonished dog. He was unlucky enough to have hold of the last juicy leg that went over the wire at its tightest time.

He had bitten many a cow through a wire fence, but this was the first time that he had been kicked by the wire itself. When Mother Earth stopped revolving round him, he just flattened out and watched that wire as it went up. When it started to come down again, you could have driven over him without feeling the bump. He knew what hit him.

Silence now descended on our little valley, broken only by my melodious voice and then that of Bluey as he started to repent. When it comes to pain for others, Bluey is all for it, but when his turn comes around he is the least brave of all dogs. He turns his tummy up and waves his paws around most pathetically. He apologetically puts out a 400 cycle note rich in harmonics at about strength 5 and hopes for no heterodynes and that I will not beat with him. When his worst fears are confirmed, he can register up to nine S points in the next valley and even higher values on the db. scales in this one.

But to return to my present predicament. I had that pole half up with a cow stuck over the wire. I couldn't lower it as some cows had since wandered under it and I did not want any more circuses. I remembered then that cows feeding through fences always extricated their heads before "taking off" no matter what the urgency was. I confidently whistled for Bluey. Bluey, in the interests of peace, and also very much against his will, was sitting up well back. I had forgotten that this was his favourite cow. He always looked on my whistle as a clear mandate to bite her. This he promptly did.

The wire and the post, together with both the cow and myself, all vibrated in unison at this sudden onslaught. The cow and myself also put out a very fine well modulated signal at about strength 9. Bluey, when he heard mine, left at high speed. I do not wish to brag but I am confident he was still copying me 5 and 9 right up to when he reached his hidey-hole under the tank stand a quarter of a mile away.

The cow got free of the wire and I hung on to that bucking post long enough to get it up as the rest of the cows raced under it. You would think that after all that trouble things would settle down, but that is not my form. In the excitement, the bolt necessary to go into the top of the fence post fell out of my pocket several yards away. The pole was still balanced on its bottom bolt so I tried to tie it temporarily with my belt to the top of the fence post, but had no luck. After some thought, I realised that it was just a matter of nicely balancing that pole on its bottom bolt while I made a dive for the bolt. (Seals do these stunts quite easily.) I found that, at my age, it was most difficult to run fast, keeping one eye on the top of a vertical 20 ft. pole, and the other on a bolt lying on the ground. After some exciting adventures along these lines I gave that up too.

After some thought I tried yelling for the XYL to come and pick it up. That failed too, but at least it brought Bluey back, waving an apologetic tail. The sun was hot and that pole wouldn't stay still, so I again addressed some pithy remarks to Bluey. He hurried off. When it was too late I realised that if my XYL had been following Bluey to aid me then she would now probably get into his hidey-hole first.

I was reduced to watching the little black ants. These in their hundreds were evidently having races up and down the pole, but I noticed that, as they ran over my hands, each paused just long enough to dig out a couple of choice morsels for sustenance on their way. I got tired of holding up that pole after a while so I lowered it, retrieved my bolt and then re-erected it. I was disgusted to think that I could have lowered it any time after the last cow had gone under the wire.

Another episode had me more worried. I had tied the end of a nylon cord to a post and run out about a hundred yards along the grass. I dropped my end temporarily and it disappeared. I saw then that an old jersey cow was standing about the middle of it blissfully lapping it up at about a foot at each lick. I didn't know whether to sneak round her and untie the end off the post or grab my end. When I did get hold of my end, I still did not know whether to worry over the possibility of her getting a half hitch round some of her internal works or to worry over possible teeth marks in the middle of my new cord. Actually she just opened her mouth and let me have it all back, about 30 ft. of it.

* * *

People would think that after dealing with cows other creatures would just be a walk-over for me; but if ever I am driven to tranquillisers it will be by chooks. Quite recently I was erecting a quite ordinary multiband at the Radio Shack under circumstances where nothing abnormal could possibly happen. I had the aerial rigged up between its poles and then I wanted one pole to come down. In my usual manner I removed the top bolt and let the pole fall in the desired direction. I always leave enough slack for this.

On this occasion I forgot that I had already taken up the slack at the other end and tied the wire to the far end of the chicken coop. The falling pole tightened the wire and gently turned the coop on to its back, one end raised and balancing the fallen pole at my end. This mishap caused me little concern until trouble suddenly erupted. My XYL had poked a stick through the wire-netting sides for a perch and four captive hens were sitting on it. Now they were on their backs. But not for long. Although in their new position there was nothing between them and the sky, those silly chooks flew at the side netting in heaps, clawing and flapping with much background music.

When they finally fell over the side, I noticed with surprise that, although under great emotional stress their sense of direction was unimpaired. Chooks differ from cows in another respect too. When they fall down in exciting times they don't waste time getting up before they start to run. This mishap must have been a great event in their lives. Although back on their two legs and with most of their feathers left, they still spent the next quarter of an hour trying to tell the world about it.

—VK4AT, A. J. C. Thompson.

INTRUDER WATCH

DAVID WARDLAW, VK3ADW
Federal Intruder Watch Co-ordinator

Over the years, crowding on the high frequency spectrum has become acute One result of this is that many stations now operate on frequencies other than those allocated to their particular service. Any Amateur who operates on the 7 Mc bands is only too well aware of this fact. More recently it has become apparent that there has been increased intrusion into the 14 and 21 Mc. Amateur bands by unauthorised stations. In the case of the 7 Mc band, a large number of the intruding stations appear to be in countries which are not members of the I.T U. and are, therefore, not bound by the frequency allocations as determined at the Conferences.

It should also be remembered that certain Amateur bands are shared with other services, e.g. in the 1800/1860 Kc. band and the 7100/7150 Kc. band. In addition, certain member countries of the I.T.U. have added footnotes to the frequency allocations, e.g. Soviet fixed stations can operate in the band 14250/14650 Kc.

It has become apparent around the world that unless the Amateurs register official complaints about these intruding stations, when frequency allocations are next reviewed the intruding stations will have a strong case to put to their administrations, based on the contention that their use of these frequencies resulted in no complaints, and that therefore they should be officially allocated the frequency in question

Therefore, several years ago in Britain and the U.S.A. an Intruder Watch system was introduced, and now a similar system has been established by the W.I.A., Australia. It is interesting to note that one of the points of great interest to the visiting delegates at the Region III. Conference held in Sydney at Easter this year was the establishment of Intruder Watch in Australia.

At the Federal Convention, each Federal Councillor was given details of the operation of Intruder Watch, together with some report forms. By now Intruder Watch Co-ordinators have been appointed in most, but not all, the Divisions. The names and addresses of the State Co-ordinators will now appear each month in "Amateur Radio".

For a report to be useful, it must be accurate as to time and frequency. It is impossible to lodge a complaint based on vague reports, which if examined, would only show the Amateur in a bad light with the Administration. In order to correlate reports from different parts of the Commonwealth, it is necessary to be able to demonstrate that each report refers to the same station. None the less, all Amateurs should be able to make observations of the required accuracy, so long as they exercise a little care. In the case of special modes, it is hoped to distribute to each Division tape recordings of the different types (radio teletype, facsimile, etc.) to enable watchers to become familiar with these transmissions even though they do not possess specialised types of receiving equipment. Those who have experience of these special forms of transmission will be very welcome as Intruder Watchers. Intruder Watching is one tangible way that all Amateurs can contribute towards the preservation of their bands.

☆

JAMBOREE ON THE AIR

The 11th Jamboree on the Air will take place over the week-end of 19th and 20th October, 1968. Starting time will be 0001 hours G.M.T. on Saturday, 19th, and the event will conclude at 2359 hours G.M.T. on Sunday, 20th October.

As a result of its recent move to Switzerland, the World Bureau will not be able to operate its own station this year. However, the International Amateur Radio Club in Switzerland has very kindly offered their own station 4U1ITU, well known to all Amateurs as the station of the International Telecommunications Union. It will be in operation for the full 48 hours of the event with, it is hoped, a team of Scout operators drawn from neighbouring countries

4U1ITU will operate on or near the following frequencies:

80 metre band. c.w. 3515 Kc.
40 metre band c.w. 7015 Kc., s.s.b. 7070 Kc. (Note 3).
20 metre band. c.w. 14070 Kc., s.s.b. 14,185 and 14,290 Kc.
15 metre band: c.w 21,070 Kc., s.s.b. 21,290 Kc.
10 metre band: c.w. 28,070 Kc., s.s.b. 28,700 Kc.

Notes: 1. The bands used will depend on prevailing conditions
2 The station(s) will operate within 5 Kc. of these frequencies so far as conditions permit.
3. The station(s) will listen from time to time, as announced, for calls on higher frequencies.

It is expected that there will be several other special stations taking part, among them being GB3BSI at Brownsea Island, ZS6JAM at Mafeking, AP2NMK in Pakistan, and, for the first time ever, an "Aeronautical Mobile" station operated by an Air Scout Troop in South Africa Other stations to look out for are K2BFW, H.Q. of the Boy Scouts of America, DU1BSP in the Philippines, GB3BPH in London, XE-IASM in Mexico, etc

SILENT KEY

It is with deep regret that we record the passing of the following Amateurs:

VK2AOG—Trevor Gabriel
VK3XO—Lee Paul

Recent Additions to Our Library

AMATEUR RADIO CIRCUITS BOOK

The second edition of this ever popular book, published by the R.S.G.B., has now arrived in Australia and should be available from your local W.I.A. Division.

In preparation of the second edition of this collection of circuits pertaining to Amateur Radio, a considerable number of new circuits has been reviewed and a number of those in the first edition replaced. The circuits cover a wide variety of applications in radio equipment. They are mainly in the form of single stage diagrams accompanied by typical component values, but in a few cases some additional information has been included where this extra data is essential. Several complete circuits are included where elaboration is desirable for clarity.

As far as possible, valve and semiconductor alternatives are provided, and in a few cases constructional data has also been included.

V.H.F. HAM RADIO HANDBOOK

Edward G. MacKinnon

Here is a brand new book that reveals the many v.h.f.-u.h.f. techniques in practice today, to escape the crowded lower frequency bands.

Written for the Amateur who takes pride in contributing to the advancement of the art, the content begins by explaining the differences between v.h.f. and lower frequency gear (such as vacuum tube limitations, lead inductance, wavelength factor, etc.). An entire chapter is devoted to propagation phenomena, including tropospheric propagation, effect of the aurora, sporadic E layer skip, and 6 metre moonbounce communications.

Transmitting equipment for 6 and 2 metres, a 432 Mc. tripler, and several modulators are described in another chapter. The chapter on antennae covers several systems for 6 metres, including a cylindrical parabola and a base-loaded whip. For those readers who want to use existing equipment, detailed instructions show how to modify the Hi-Bander, Gonset II., Heath Seneca and Heath Sixer are included.

The final section contains 25 additional projects—some for the less experienced operator and others for the more knowledgable one. Included are circuits for medium and low power transmitters, receivers, pre-amps., filters, r.f. amplifiers, a field strength meter, noise generator, and oscillators for 50, 144, 220, 432 and 1296 Mc. Truly a book every Amateur will want to own.

Published by Tab Books, May 1968, this is No. 460 in their series. Price: $US6.95 hardbound, $US3.95 paper. 176 pages, over 100 illustrations. Our copy from the publishers.

ELECTRONIC HOBBYIST'S IC PROJECT HANDBOOK

Bob Brown and Tom Kneitel

A brand new book containing 50 integrated circuit projects for hobbyists, experimenters, technicians, hams, audiophiles—even professional designers!

Here's how electronics enthusiasts can become familiar with those fascinating components—integrated circuits—and have fun building some useful devices at the same time. In all, this new book describes 50 different projects, all based on using popular inexpensive IC's.

Some of the devices—such as the 1 watt phono amp. and IC power supply—can be built in an evening. More sophisticated projects—like the electronic organ or the R.I.A.A. equalisation pre-amp.—offer a greater challenge. The book also shows how to build practical devices like the tachometer with bulb alert, or the 50-watt amplifier, or some "just for fun" gadgets like the simple memory tester or the miniature adding machine.

Amateur projects include a wide variety of transmitters, receivers, code keyers, mike pre-amps., etc. Technicians can make good use of such items as the IC tester, square-wave generator, and color t.v. convergence generator.

This is the first book of its kind—anywhere—and the projects are among the most fascinating ever published. If the reader's interests are strictly professional, the final section contains schematic diagrams for 32 of the most popular integrated circuits currently available.

Published by Tab Books, June 1968, this is No. 464 in their series. Price, $US6.95 hardbound, $US3.95 paper. 160 pages, 100 illustrations. Our copy direct from the publishers.

VICTORIAN 160 METRE CONTEST

We have been asked by the VK3 Division to clarify the matter of bonus points applicable to this contest.

The bonus of 20 points does NOT apply to each contact made from a National Park, but may be claimed for EACH National Park from which contact is made.

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CONTEST CALENDAR

Until 31st December: Concurso Mexico 1968. (L.M.R.E.)
5th/6th October VK/ZL Oceania DX Contest, Phone Section (N.Z.A.R.T.)
12th/13th October: VK/ZL Oceania DX Contest. C.W. Section (N.Z.A.R.T.)
12th/13th October: 28 Mc. Phone Contest (R.S.G.B.)
26th/27th October "CQ" W.W DX Contest Phone Section.
26th/27th October: 7 Mc. C.W. Contest R.S.G.B.)
9th/10th November 7 Mc. Phone Contest (R.S.G.B.)
23rd/24th November "CQ" W.W. DX Contest, C.W. Section.
7th Dec., 1968, to 12th Jan., 1969: Ross R. Hull V.H.F Contest (W.I.A.)
1st/2nd Feb., 1969 John Moyle Memorial National Field Day (W.I.A.)

—D. H. Rankin, F.E.

WIRELESS INSTITUTE OF AUSTRALIA—FEDERAL EXECUTIVE

AMATEUR JOURNALS

The Institute can now offer annual subscriptions and publications put out by following Amateur Journals

(Revised prices based on remittances forwarded by the Institute)

★ A.R.R.L.—**"QST"**—Associate membership and renewals **$6.40**

★ R.S.G.B.—**"RADIO COMMUNICATION"** (ex "The Bulletin")—membership **$5.50**
Send for application form and FREE sample copy of the R.S.G.B. "Radio Communication"

★ **"CQ" MAGAZINE**—One year's subscription **$5.70**

★ **"CQ" MAGAZINE**—Three years' subscription **$13.50**

★ **"73" MAGAZINE**—One year's subscription **$5.50**

★ **"73" MAGAZINE**—Three years' subscription (very good buy) **$11.50**

★ **"HAM RADIO" MAGAZINE**—A new American magazine put out by Jim Fisk, W1DTY (ex "73"), yearly **$4.50**

Send remittance to Federal Executive, C/o. P.O. Box 36, East Melbourne, Vic., 3002

AMATEUR PUBLICATIONS

A.R.R.L., R.S.G.B., "CQ" and "73" publications also available as hereunder

(Remittances and orders to be sent to Divisional Secretaries for bulk handling)

A.R.R.L. PUBLICATIONS

Radio Amateur's Handbook, paper cover	$5.00
Radio Amateur's Handbook, buckram cover	$6.30
The Mobile Manual for Radio Amateurs	$3.00
Single Sideband for the Radio Amateur	$3.00
A.R.R.L. Antenna Book	$2.00
The Radio Amateur's V.H.F. Manual	$2.25
Understanding Amateur Radio	$2.25
Hints and Kinks for the Radio Amateur	$1.25
A Course in Radio Fundamentals	$1.25
How to Become a Radio Amateur	$1.10
The Radio Amateur's License Manual	$0.60
Learning the Radiotelegraph Code	$0.60
Radio Amateur's Operating Manual	$1.25
Calculators, Type "A" or "B"	$1.20
A.R.R.L. Annual Report	$1.10

R.S.G.B. PUBLICATIONS

Amateur Radio Circuits	$1.20
Technical Topics	$1.50
Sideband Equipment	$0.45
Communication Receivers	$0.45
Radio Data Reference Books	$1.85

"CQ" PUBLICATIONS

Antenna Round-up, No. 1	$3.50
"CQ" Anthology, No. 1	$1.75
"CQ" Anthology, No. 2	$2.75
V.H.F. for the Radio Amateur	$3.00
Electronic Circuits Handbook, No. 1	$2.75
Electronic Circuits Handbook, No. 2	$2.75
New R.T.T.Y. Handbook	$3.25
Shop and Shack Short Cuts	$3.25
New Sideband Handbook	$2.50
Surplus Schematics	$2.25
Surplus Conversion Handbook	$2.75
New Mobile Handbook	$2.50
The Ham's Interpreter	$1.60
The Amateur Radio DX Handbook	$4.00

"73" PUBLICATIONS

The DX Handbook	$2.75
Diode Circuit Handbook	$1.00
Transistor Circuit Handbook	$1.00
Ham R.T.T.Y.	$2.00
The V.H.F. Antenna Book	$2.75

WORKED ALL VK CALL AREAS (W.A.V.K.C.A.) AWARD

OBJECTS

1.1 This Award, to be known as the W.A.V.K.C.A. Award, is offered by the Wireless Institute of Australia as tangible evidence of the proficiency of overseas Amateurs in making contacts with the various call areas of the Commonwealth of Australia.

1.2 The Award may be claimed by any Amateur in the world who is a member of an affiliated Society of the I.A.R.U., but no Australian Amateur will be eligible.

REQUIREMENTS

2.1 A handsome Certificate will be awarded to any applicant who makes contacts with Australian Amateur Stations in the areas shown in the attached Appendix. The number of contacts required in each area is also shown.

OPERATION

3.1 Contacts between overseas stations and Australian stations must have been made on or after the 1st January, 1946.

3.2 Contacts may be made using any authorised frequency band or type of emission permitted to Australian Amateurs, but cross band contacts will not be allowed.

3.3 No contacts made with ship or aircraft stations in Australian territories will be eligible, but land-mobile or portable stations may be contacted provided the location at the time of contact is shown on the confirmation.

VERIFICATIONS

4.1 The applicant must submit documentary written evidence, confirming that two-way proof, in the form of QSL cards or other contacts have taken place. Such verifications must show the date and time of contact, type of emission and frequency used, signal reports and location (in the case of portable or land-mobile operation) of the stations contacted.

4.2 Verifications must be submitted exactly as received, and forged or altered evidence may result in the disqualification of the station concerned.

4.3 A list, in accordance with the details required in Rule 4.1, must be submitted with the application for the Award.

APPLICATIONS

5.1 All claims for the W.A.V.K.C.A. Award must be made by the submission of the confirmations (Rule 3.1), together with the list (Rule 4.3), direct to "Awards Manager," Box 2611W, G.P.O., Melbourne, 3001, Victoria, Australia. Sufficient International Reply Coupons must be enclosed to cover return postage of the confirmations to the applicant.

5.2 Where a reciprocal agreement exists between the W.I.A. and the applicant's Society, the appointed officer of that Society will carry out the check, and if correct, will forward a written application for the Award on behalf of the applicant, together with the list (Rule 4.3).

5.3 Applications will be examined by the Awards Manager, who will arrange for the Award to be forwarded either direct or through the applicant's Society. The Awards Manager's decision on the application and interpretation of these Rules will be final and binding.

5.4 Notwithstanding anything in the Rules to the contrary, the Federal Council of the W.I.A. reserves the right to amend these Rules as necessary.

W.A.V.K.C.A. AWARD

The following Amateurs have received this Award during the period 1/1/68 to 30/6/68.

Cert. No.	Call	Cert. No.	Call
316	ZS1DC	328	SM5YV
319	VE3EVU	329	VE3BAP
330	ZL1ASY	330	JA1JAN
331	OK1ADM	331	JA2IYJ
332	OK1ADP	332	JA1IIX
333	UJ8AB	333	W3PVZ
334	UA0CA	334	SM5CZY
335	9M2NF	335	DJ2YL
336	JA3EDG	336	JA4KW
337	OK3DG		

APPENDIX

Territory	Call Area	QSLs Required
Australian Antarctica, Heard Island, Macquarie Island	VK0	1
Australian Capital Territory	VK1	1
Lord Howe Island, State of New South Wales	VK2	3
State of Victoria	VK3	3
State of Queensland, Thursday Island, Willis Island	VK4	3
State of South Australia	VK5	3
State of Western Australia	VK6	3
Flinders Island, King Island, State of Tasmania	VK7	3
Northern Territory	VK8	1
Admiralty Islands, Bougainville Island, Christmas Island, Cocos Islands, Nauru, New Guinea, New Ireland, Norfolk Island, Papua Territory	VK9	1

Note.—In Areas above, where more than one confirmation is required, contacts may be made with any or all of the Territories listed in brackets.

☆

RADIO SOCIETY OF EAST AFRICA AWARDS

To come into line with the independent status of Kenya, Uganda and Tanzania, the R.S.E.A. have issued a new award for contacts made with these three countries since 1st January, 1968. Applications for the old award will be considered for as long as stocks last. The conditions for the new award are as follows:

(a) Two-way contacts c.w./a.m./s.s.b./mixed on any bands with a total of four stations in Kenya, Uganda and Tanzania including at least one contact in each of these three countries, or

(b) Two-way contacts c.w./a.m./s.s.b./mixed on any bands with a total of ten contacts in any two of the above countries, but including two contacts in one of these two countries.

QSLs are not required but applications should be certified by the national society or by two other Amateurs. Applications should be sent with 15 I.R.C's or 1 dollar to the Awards Manager, 5Z4KL, C/o. R.S.E.A., Box 5681, Nairobi, Kenya.

The above award is in green, black and white and is very attractive, depicting East African game against a background of palm trees, thorn trees and hills.

W.I.A. 52 Mc. W.A.S.

Additional Members to 30/6/68

Cert. No.	Call	Additional Countries
79	VK5ZTN	-
80	VK5EF	-
81	VK3ASI	3
82	VK3OF	3

TRIO

2 METRE TRANSCEIVER

TR-2E

FEATURES:

SEPARATE V.F.O. FOR TRANSMITTER AND RECEIVER

- CRYSTAL CONTROL
- SQUELCH
- NUVISTOR FRONT END
- TRIPLE CONVERSION RECEIVER
- NOISE LIMITER
- A.C.-D.C. OPERATION
- INBUILT POWER SUPPLY

SPECIFICATIONS

RECEIVER	
Frequency Range:	144-148 Mc AM
Sensitivity:	1 microvolt for 10dB S/N at 145.5 Mc (0.05 W Audio Output)
Image Ratio:	50 dB at 145.5 Mc
IF Frequency:	1st IF 44-45 Mc 2nd IF 10.7 Mc 3rd IF 455 Kc
Noise Limiting:	Automatic
Squelch:	1 microV-300 microV.
Selectivity:	20 dB down at 10Kc
Audio Output:	3W 8 ohms
Input Impedance:	50 ohms (Unbalanced)
TRANSMITTER	
Frequency Range:	144-148 Mc AM
Power Input to Final:	22 to 26 Watts
RF Output Power:	10W 144-146 Mc AC 240V Operation 9W 144-146 Mc DC 12.8V Operation
Crystal Type:	FT-243
Crystal Frequency:	8-8.222 Mc
VFO Frequency:	8-8.222 Mc
Microphone Input:	High Impedance w/Push to Talk
Frequency Response:	—3 dB at 300 and 3,000 c/s
Output Impedance:	50-100 ohms w/Coaxial Connector
POWER SUPPLY	
AC Operation:	117/230V 50/50 c/s Receive Power Drain 106 VA Transmit Power Drain 146 VA
DC Operation:	DC 12.8V (12/14V) Receive Power Drain 90 VA Transmit Power Drain 120 VA
Tubes and Transistors used:	16 Tubes 1 Nuvistor, 8 Diodes, 4 Power Transistors
Dimensions:	H: 6⅝"; W: 11⅞"; D: 12¾"
Weight:	22.2 lb

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Obtainable from your Divisional Secretary, or W.I.A., P.O. Box 36, East Melbourne, C.2, Victoria.

TOM M. B. ELLIOTT, VK4CM

Tom must surely be one of the most interesting survivors of that almost extinct species known as the Radio Amateur Experimenter.

Not content with sharing in two honourable plaques (Sound and Television) in the City of Brisbane, he went even further afield and played an unobtrusive part in the flight of the Southern Cross across the Pacific in 1928.

It seems strange that such service to his fellow Amateurs and to Australia should be so soon forgotten.

But not by all!

He was recently made a Fellow of the Royal Historical Society of Queensland, and his records and log books safely stored for historical purposes at Newstead Park, Brisbane.

In our quaint way we always wait for people to die before giving them the honour that is their due.

Tom calls these plaques his epitaphs. The first one is situated in the entrance to the Queensland Insurance Building and reads: "Sound Broadcasting originated in Queensland from this building. Transmissions commenced 1920 and continued to 1923 under the auspices of Dr. V. McDowall. The installation was designed and operated by Thomas M. B. Elliott."

The second plaque is on the Old Observatory Tower (convict built) and reads: "An experimental television station was established in the Windmill in 1935 by Dr. Val McDowall and Thomas M. B Elliott The first actual television transmission in Australia was broadcast from this tower."

Speaking from memory, he said that the scanning disc was used in 1930, a mechanical drum in 1935 and electronically (200 Mc. and 180 lines) in 1938.

In many cases the valves were home constructed and the necessary chemical and coatings scrounged in devious ways.

His curious connection with the Southern Cross flight is little known.

It commenced with his radio contact with Messrs. Hines and Kaufman, makers of the radio installation on the Southern Cross prior to its departure.

They had installed a 50 watt transmitter on 33 metres with 1,000 volts supplied by a wind-driven generator.

Two-way contact was established at Fiji with the Southern Cross having navigational troubles. The radio operator (Warner) asked Tom to keep his key down on his 500 watt transmitter to provide a "beam". This they followed to about 100 miles off the coast when they lost it.

In 1958, Warner was brought to Australia by Qantas. He met Tom and signed his log book.

At present an attempt is being made to link these two up by Amateur Radio, but Warner is in and out of hospital in Oakland, California, and Tom has recently been admitted to a convalescent home, so there is little chance of success.

Tom had a stroke about five years ago and it affected both his speech and balance. He was able to operate a small 3 watt outfit that operated phone quite well up to a couple of hundred miles where the noise level was low.

At present his 5 watt transmitter and a windom aerial gives him quite a good signal and a wider range.

At the time of writing (7/7/68) he has not been on the air for several days. He is still on the Gold Coast, but now at The Golden Years Convalescent Home, Mermaid Beach, Qld.

—A. J. C. Thompson, VK4AT.

FEDERAL QSL BUREAU

Jack Smyser, W6BPO, who also owns the call sign VK2BPO, will be visiting Sydney again mid February, 1969. He will be accompanied by W4WS. Together and possibly with another VK2 they will activate Norfolk Island for a few days. Then they will proceed to VK9 Cocos-Keeling Islands where similar operation is planned.

Ray VK9LR, who has been active from the Mission Station, Goroka, for some time, is returning to the mainland in December

Bruno Bossert, HB9QQ, who is no stranger to VK, is migrating back here with his wife and child. Bruno, who expects to settle in Sydney, will reach that port on the Iberia about 15th December

A reunion of present and past P.M.G. telegraphists was held in the Melbourne Town Hall in August. The function was most successful and attracted an attendance of almost 500. Amateur Radio was represented by Wally Matters, VK3MJ Roy Perry, VK3OU, Alf Oxnam, VK3OU, and of course yours truly. Ex members of the Radio Branch present in their own right were Len Pearson Frank Punch and Joe Keating The previous function of this nature was held at the same location way back in 1919 to welcome home from active service all serving P.M.G. telegraphists

Ray Jones, VK3RJ, Manager.

Q S L ?

All through life we carefully preserve documents showing that in the year so and so we were born, vaccinated, married, promoted, acclaimed, honoured, and finally retired. These are valuable to all of us.

The QSL card which the Amateur finds in his mail box is his document of a worthwhile contact, tangible proof of his accomplishment.

Without QSL cards there would be no DXCC, WAC, WAS, WAZ or awards of any kind and the pride of accomplishment could not be realised.

The Amateur who works hard for his ticket, sets up his "rig" and makes worthwhile contacts looks forward to a QSL card for confirmation

Not ALL Amateurs are interested in QSL cards, but those of us who take the trouble to send QSLs of our own accompanied by the necessary IR Coupons or stamps of the country worked and a self addressed envelope deserve a little consideration.

QSL cards make ME happy Won't you help by sending me YOUR card? Thanks and may you be rewarded for your kindness and consideration.

—W5RU, Roy L. Alciatore, 5700 Canal Blvd., New Orleans, Louisiana, U.S.A.

V.H.F. NOTES

Dates worth noting in the v.h.f. field —

October 12 and 13: V.h.f. Group Convention at Bendigo.
October 19 and 20 Jamboree on the Air.
October 27 First v.h.f. field day for season.
November 17 V.h.f. field day
December 15 V.h.f. field day
January 19 V.h.f. field day
March 16 V.h.f. field day

There is no separate v.h.f. field day in February, but it is hoped to arrange a field day over the New Year week-end.

News from the other States is still noticeable by its absence. What is going on, have all the v.h.f. stations gone on the blink, or is everybody building new gear for the coming season? News of activities, club and otherwise, field days and conventions is always welcomed.

The Auckland V.h.f. Group Inc. is trying to arrange schedules with VK Amateurs this coming summer The frequencies they are most interested in are 144 and 432 Mc. If you are willing to assist them, please send them the following details: call sign, location, power, frequency and antennas system,

—73, Cyril VK3ZCK.

VICTORIA

2 Metres: Talk heard around the band indicates a swing to the use of v.f.o's and s.s.b. amongst some of the locals.

Gil VK3ZGS has a s.s.b. exciter sitting ready for use while Ken VK3ZNJ is working on a unit and is well on the way to coming up with a few watts. Cyril VK3ZCK has a filter rig built for 20 metres which he hopes to place on either 6 or 2 metres soon.

Some of those operating s.s.b. on two metres are VKs 3BW, 3BQ, 3CP, 3ASQ, 3AHL, 3ZER, 3RV, 3ZLT and 3ZPX. Quite an impressive list isn't it and it's not complete.

Using a.m. or s.s.b. the use of stable(?) v.f.o's is increasing and operation is beginning to show a trend to the type used on the h.f. bands where calling is done on a wanted station's frequency

Readers are reminded of the V.h.f. Group's Convention to be held at Bendigo on 12th and 13th October The location is 3½ miles out on the Spring Gully Road. Keep this week-end free to attend, it promises to be very interesting.

6 Metres: Readers of these notes in other States will remember that t.v.i. is a great drawback to operation within this band. Even though on Sunday mornings and late week nights, signals can be heard and contacts made.

VK3AOT has just finished a 150 watt n.b.f.m. rig with v.f.o. control, this being fed to five beside five stacked vertical beams, pokes out quite a signal

Mac VK3RV is also regular on this band with a rig that runs a.m. (full plate and screen), narrow band f.m., and single sideband. The final runs about 20w p.e.p. and really gets out well.

Yours truly is running 400 watts p.e.p. out to a pair of 4-125As using upper sideband.

No reports have been received on DX, but we are all prepared and ready for a really good season.

—73, Robert VK3ZPX.

Wireless Institute of Australia
Victorian Division

V.h.f. Group Convention

to be held at

BENDIGO

on

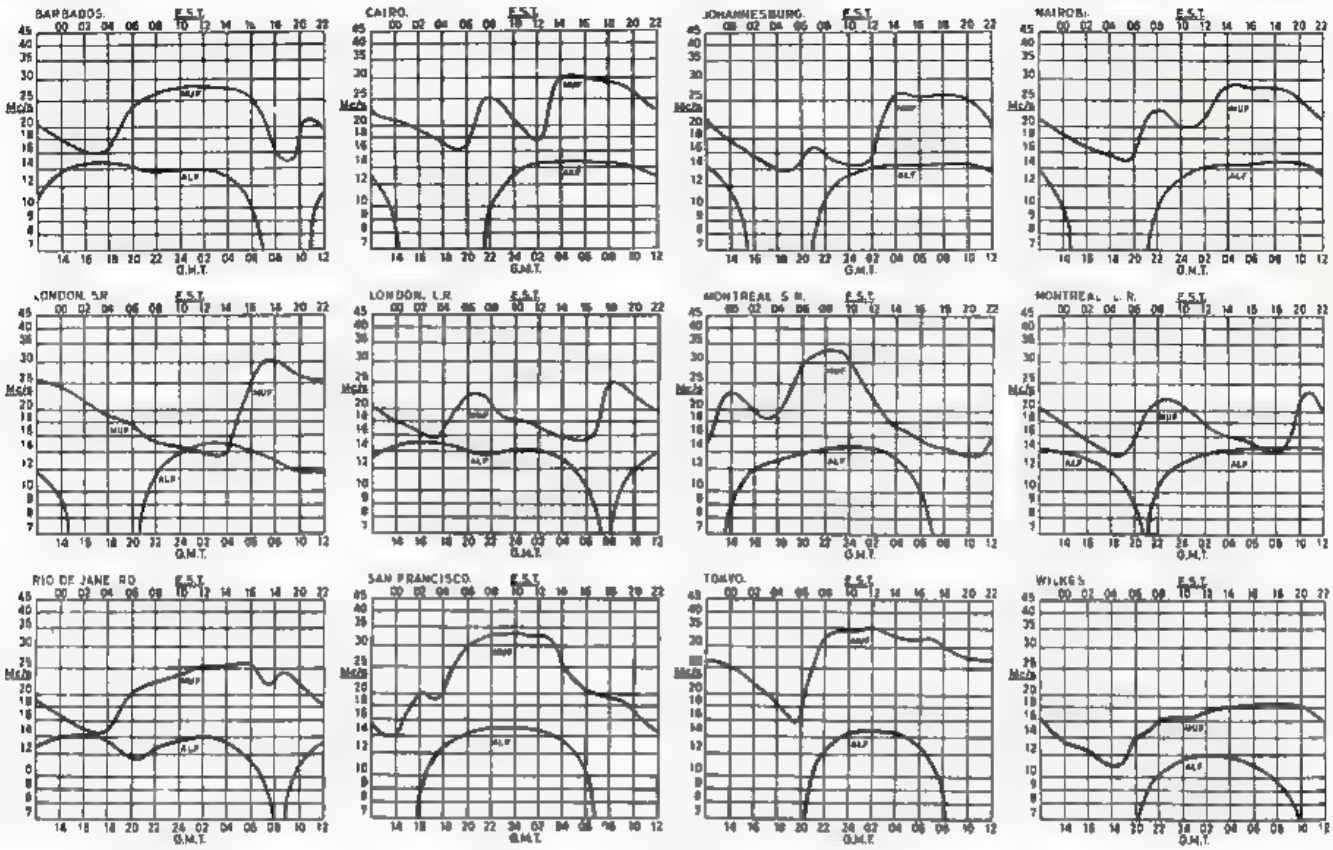
SATURDAY and SUNDAY,

12th and 13th OCTOBER, '68

Further particulars from Secretary, V.h.f. Group, P.O. Box 36, East Melbourne, Vic, 3002. Please mark envelopes "Convention".

PREDICTION CHARTS FOR OCTOBER 1968

(Prediction Charts by courtesy of Ionospheric Prediction Service)



DX

Sub-Editor PETER NESBIT, VK3APN
32 The Grange, East Malvern, Vic., 3145

BAND NEWS (all times in G.M.T.)

80 Mc. Although 8 mx news is ordinarily restricted to the V.h.f. Notes, this item was so interesting that it is being included here:

W8GZ is on 52050 Kc, c.w., beaming towards VK with a rhombic. Beginning 1/9/68 for a period of two months, he is calling from 2200 until 2230z. He calls the first 2½ minutes and listens during the second 2½ minutes. He also maintains a check on 21415 Kc.

28 Mc. With winter now past, conditions are improving with Ws and ZSs being worked. The main problem now seems to be lack of activity.

ZD3D operates on 28850 at 20z. QSL W8JVN.
VP5CP from Turks/Caicos area, 28850 at 22-23z at week-ends.
VS6FX near the low end on c.w. at 09z.
XW8AX 28890 09z; also 28625 at 12z.
KX6ER active most days 28050 from 05 to 08z, also 11 to 13z.
EP2JP 28500 at 0945z.
LX1SK 28460 at 2047z.
ZP3AL reported on 28600 at 2020z.
7X0AH on 28040 at 1050z.
FO8BI activates 28570 at 2135z.
HC8FN 28680 at 2230z.
KS6CN at 0038z on 28559.

21 Mc. CR6GA and CR6JX on 21286 at 20z.
ZD8GA 21285 at 22z.
ZD8Z (2100-2030z) says he may go to Cocos-Keeling for four to six months.
VP2DAJ 21260 at 2215z, on a.m.
9K2s CC and CB reported on 21375 and 21365 around the 1930-2000z mark.
VS9MB 16z on 21295.
TL8DL dislikes pile-ups. He prefers to speak French. Look for him around 21305 at 1130z, and if you QSL direct send it to B.P. 924, Bangui, Central African Republic.
TJ1AQ at 1120z on 21310.
TU2AZ at 1220z on 21220.
ET3REL, 21250 at 2105z.
9Q5PT 21082 at 2242z.
JT1CY, 21083 at 1930z.
For those who like to get up early, 6W8XX at 15-16z on 21036.
8O1GB also gets them out early: 15z 21375. Also reported at 16z on 21350. QSL W1YRC.
VQ9L at 18z on 21305.
VP8JD at 20z, 21035.
BY1PK at 1630 on 21050, but are we allowed to work these chaps?
CR7IZ at 14z on 21029.
CT2AV, 0816z, on 21077.
FB8XX, 0918z around 21070.
9N1 "Mickey Mouse" at 1055 on 21336.
OD5LX 1318z on 21047.
5R8AD at 1530z on 21200.
ZD8GA and TJ1AL pile them up on 21280 around 16z.
4W1ADO from Yemen at 1530 on 21240.
6W8AL at 1846z on 21310.
LX2FB 1920z on 21050.
9X5PS 1945z on 21090.

From 20 to 21z there are 8Q5IA 322, OY5NS 397, YN2RAC 283, SV0WN 045, and at 22z 5Z4LE 21043.

14 Mc.: PX1KT, Mike, 2245z on 14206. QSL via F3KT.
PX1UP 0035z 14225. QSL via HB9UP.
VU2JA at 0133 on 14050.
HB0AAI 0229z on 14230. QSL via HB9AAI.
FR7ZD 04z on 14187.
At 05z, JW2AP 235 and KJ6BZ 246.
VR4EL at 0545z, 14322.
At 10z on 14240, both KA1MI (Marcus Isl.) and KA1IJ (Iwo Jima).
Bill 9M2CP at 1039 on 14204.
VP2LA "Alvin" at 1952 on 14229. QSL via VE3EUU.
PZ1BW 1056 on 14208.
HB0AJC 1114 on 14224 "Bruno" requests QSLs via HB9AJC.
K1EUP/KS6 operates between 14211 and 14231 around the hours of 11-12z.
VP2GW 1140z, 14188.
Between 12 and 13z there are HM9A 201 operated during some sort of Korean national DX-pedition, VK9RL Nauru, QSL via K6UJW; KC6JC 215, with QSLs via W2RDD, and VE-7IR, YB1 197.
VS6AA "Maurine" at 1402z on 14022.
Between 20 and 21z XW8AX 194, TU2AZ 196, LX1RC 190, 5T5AD 185 (name Alban), FC2CD 122.

9U5BB and ET3USA have been heard on 14195 and 165 respectively at 1845z.
ZD8CC populates the area around 14200 at 21z or so.
TJ1AS on 14004 c.w. at 2130z.
CR3AT on 14060 at 2130 to 2215z.
ZL2AFZ reports from New Zealand with the following —

BV2A	030 1358.	VQ9B	063 2025.
6W8XX	005 2204.	7G1IX	014 1804.
7P8AR	045 1755.	FR7ZG	190 1820.
HB0AG	306 0715.	HC8RS	162 2315.
HK0BEO	135 2000.	JX4EJ	242 1944.
OY9IM	200 2147.	TJ1AP	125 2035.
TR8AG	133 2137.	YB1O	177 0050.
ZD7DI	207 1615.	9L1KZ	130 1825.
CE9AE	225 0953.	4A1TQ	012 0400.

TA1AV 058 0810 (also heard 039 at 1805z).
VP8KF activates Falkland Isl. 14175 around 2045z, but skeds may be arranged through G3VVU. QSL goes via G3TWV.
(Thanks George—Peter.)

7 Mc. Conditions continue to improve. There have been some good long path openings to the States from about 21z onwards. Europeans are beginning to respond to calls, and by the time this reaches you, they should be easily workable (try 20z).
Active stations include:
JW2BH working s.s.b. on 7070 at 22z.
CR6AI on 7011 at 2230z.
CR6CK heard here on 7020 at 2330z with a 599 signal, but faded almost right out a few minutes later.
KV4DB 7011 at 1035z.
VQ8CC on 7006 at 1350z with a good signal.
CM2DC and CM2KW on 7020 around 06-10z. QSLs via Box 6806, Havana, Cuba.
EI8BS worked at 0627z on 7018.
MP4BGU on about 7010 at 2110z.
UI8KAA on 7008 at 1305z—quite an early opening to this area.
ET3USA with a 599 signal on 7014 at 2255z, was audible until about 2340z.
VQ8JW/A—Aldabra. Will make skeds for 1645-1845z or so, preferably on odd dates because he is QRV for Ws on even dates.

3.5 Mc.: 80 mx is also improving as summer approaches, and Ws are workable every evening. There is still not very much activity in the mornings however.
JW2BH operates 3708 c.w. at 22z.
VQ8JW/A makes skeds for this band as well.
ZK2AE and OA6V reported on 80 mx phone.

1.8 Mc.: ZL3GQ on 1842 listens for VKs around 1805 every Monday evening. Try 09-10z; his signals are quite good.
The Monday skeds with W4BGO and W9BGX continue. W4BGO on 1805 calls for 2½ minutes and listens the next 2½ minutes, beginning 1635 until 1656z. W9BGX then takes over with a similar calling procedure until 1115z.
VQ8JW/A!!

AWARDED

If you recently worked a 4J0 or a 4L0, chances are you contacted the DX-pedition to Wrangel Island by UA3CS, UA3FT and UB5UN.
UA1KEA operates from Antarctica; UA1KFT from Nova Zemla, and UA1KED from Franz Josef Land.
The HV1SJ using c.w. on 14 Mc. is branded a pirate by DL1DAA who, in a QSO with HV1SJ, was told that c.w. is never used.

The sunspots have now passed their peak and are now gradually declining. Latest numbers for this year are: June 114, July 110, August 109, Sept. 108, Oct. 107, Nov. 106, Dec. 105. Note that these are the predicted smoothed numbers, and the actual numbers may turn out to be above or below those expected.

XW8AX states he will be active for the next three years; he requests no breakers in the middle of a QSO, or he will start a "little black book".
5W1AT: As from 1st April, has been using 5W1AR as his call sign.
PY0SP and PY0DX hope to activate some rare places some time in December.
YJ1DL/YJ8DL operates all bands.
AC3PT appears to be legitimate despite earlier anxieties.
The prefix for ZS8 has been changed to 7P8.
VS9MB has not been able to operate 15 mx due to technical difficulties, and yet this call has appeared on 15 mx operated by "Harry". Hmmm.
Those who missed Lord Howe Isl. activity will get another chance when VK5XK arrives there during October. Operation will be on all bands.
WA9FZQ has been issued F0CV for operation the next year from Aix-en-Provence, France. He plans 10 and 15 mx s.s.b. operation to give as many as possible the new prefix. QSL direct with I.R.C. to Dan Weinstein, Year in France Program, 14, rue du Quatre, Septembre, 13 Aix-en-Provence, France.

VE7IR/YB1, operating from near Djakarta, says only YB0, 1, 2, 3 are licensed so far, but he expects other islands besides Java to come on soon as YB4, 5, etc.

YA5RG is said to be hungry for 3.5 and 7 Mc. contacts!
If you worked FB8YY between March 9 and December 13, 1967 (only) then send your card via F9MS.
A suspicious finger is pointed at PY0SOL (21005 1735z) and PY0FDN (14045 c.w. and 14105 s.s.b. 04z) by PY4BLR, NEDXA, and WGDXC.
UP0 stations are "North Pole Drifting Stations" (icebergs) and count as zone 40.

ACTIVITIES

Bruce VK3BM reports from Quambatook with the following news: 160 mx, hopes to be on again (s.s.b.) around late September. 80 mx, worked OA8V on 3685 at 1128z ("Gave me 5/8"!), 40 mx, regular contacts with G3AOO on 7084 at 0850z; 20 mx, wide open everywhere; 15 mx, 23-24z W/VE, G and Central/South America. G2YX often on with a good signal. Worked ZP5KN at 00z on 21316. 10 mx, beginning to open up after a winter spell. Ws, ZSs, etc., are workable but the trouble is lack of activity—not condx. (Thanks, Bruce, this sort of news is much appreciated.)

From VK5BS come a couple of interesting letters. "Latest 14 Mc. c.w. contacts include DJ9NX, F8CS, I1EVK, G3FFZ, DM2BJD, XE-1NNR (Box 349, Veracruz) and masses of Ws. Best QSLs include 5VZ8CM, HP1IE and FR7ZN. The QRP Contest was washed out by the AA Contest, but the following QRP QSOs were managed—WB2JYN, W5QWN, WA5KOI, WA-1CBP, W2EMW, K7LNS, ZL1BDN, WA2VWI, K7PJO, K3CQQ and K7NHG. On 19th August I heard VK3APN calling W9BGX on 160 mx—darned if I could hear the W9, but about the same time I heard a WB6 about 5 Kc. up. Am still hearing a couple of ZLs on approx. 1977 working break-in c.w., but they don't identify very often . . ." Barry reports there are eight VK5s active on 160 as at 6/8/68. (Thanks Barry.)

George Allen, L6042, reports from Perth with the following: "Good ones on 14 Mc. c.w. lately are YV5AE, YN1MO/W4, WA8QIY/KL7, HS1EL, VE7IR/YB1, DL1SU/YB, WA2AOV/HL9, YS1AG, UH8DT, UJ8AH, HK1ABB, HL9KQ and UI8AG. Can hear quite a bit of phone activity on 1825 (VK3 net freq), but mostly too weak to read, and QSB is bad." (Many thanks, George, please send further reports.)

From Dud VK4MY. Worked on 20 mx s.s.b., 9G1GG 0750, LX2FB 0550, DM2BUD 0600, VE-8AJ 0710, 8G1DY 0630, VE0MZ 0700, 9L1KZ 0800. On 20 mx, c.w., VE4IM 0720, LZ2KKZ 0650, UY5UW 0715, TJ1AJ 0630, FG7TG 0656, VE8HH 0735, ZS5QU 0620, CR9DA 0650. Heard on 20 mx c.w. was 3A2MJC at 0730z. (Thanks, Dud, a nice list.)

Don L3022 reports the following: W6TLK/KL7 (Adak Isl.) at 0822z, LX2FB 0825z, DJ-5JK/CT3 (QSLs via DJ2IW), UA2AB in Kaliningrad 1423z, ZL8AA every night at 08z, and LA8VL/MM with QSLs via LA2DD. Don helps out with details of the "Gateway to Africa" award, which are:

Issued by C.H.C. Chapter No. 3 in South Africa for hearing/working some of the following stations to make up 25 points. At least three call areas must be worked.

10 points for ZS1AB, 3AB.
5 points for ZS1ACD, 1CY, 2MH, 3AH, 5OA, 5OB, 6ACD, 6IW, 6YB.
3 points for ZS1NQ, 1OU, 1RM, 2FA, 3D, 4IO, 4JS, 4MG, 5BP, 6ATA, 6IX, 6TD, 6ADU, 6BEJ.
Send list certified by two other Amateurs, plus S.A. 5/- to ZS1ACD, Box 1187, Capetown, South Africa. (Thanks, Don—Peter)

SUMMARY

Owing to space limitations, the usual list of QSL managers and addresses will be held over until next month. Truly the list grows day by day.

This column derives much of its information from overseas DX bulletins on an exchange basis. To keep these overseas reports coming in, it is necessary for me to regularly send lists of DX overseas. To assist in this regard, YOU could jot down details of any really good DX that you hear (time, frequency, QSL manager if given, and so on), and send it to the address at the top of the page. (You don't even have to work the station, just be 100 per cent. sure of the call sign.) Other information such as requests for skeds, etc., is welcome and will be sent overseas to the appropriate place. The deadline is at the end of each month, late reports being held over.

Acknowledgments to LIDXA, FLADXC, ZL-2AFZ, VK5BS, VK4MY, VK3BM, L2022, L6042. See you next month. 73, Peter VK3APN

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

"S.W.R. INDICATORS—FACT OR FICTION"

Editor "A.R.," Dear Sir,

I have read with interest and appreciation the article of VK2JR, "S.W.R. Indicators—Fact or Fiction"

However, in my search for light in dark places, there are some points which are not clear to me, and on which the author might care to expand —

(1) Has anyone who has gone beyond elementary electronics ever said that a travelling wave in a conductor, either incident or reflected, consists of a rush of electrons to and fro? If not, why labour the point?

2) If reflected power is a somewhat mythical quantity, and if forward and reflected waves are somewhat of a mathematical fiction, what causes the instrument known as a V.S.W.R. Indicator, of either co-axial or open line type, to register?

3) What is meant by "Electron flow in the metering and diode circuits is shown in solid lines for magnetic component and dotted lines for electrostatic component"? Is this meant to convey that electrons come under the influence of opposing forces from a magnetic field and from an electrostatic field simultaneously?

(4) A circuit of a V.S.W.R. Indicator is shown and an explanation presented of a condition such that neither meter reads. I have used different manufacturers' versions of this type of co-axial V.S.W.R. Indicator, and have found that one meter (the "calibrate" meter) always reads. What explanation has the author for this condition?

(5) The author states that reflected power is mythical and imaginary, forward and reflected waves are a mathematical fiction; and standing waves are hypothetical. But he includes the statement that "the hypothetical standing waves and imagined reflected energy, **still, mathematically speaking, bounce forth and back along the transmission line.**" How can these concepts be a mathematical fiction, and at the same time, mathematically speaking, bounce forth and back along the transmission line?

—J. C. Redman, VK2JE.

N.F.D. CONTEST

Editor "A.R.," Dear Sir,

Firstly, I wish to agree with Mr. Hunt's (VK5QX/P opening remarks in August "Amateur Radio" with regard to the lack of space afforded to the results of the 1968 John Moyle Memorial N.F.D. Contest. Admittedly the Magazine Committee, in their wisdom(?) are trying to conserve space, but as this is one of the major contests on the VK contest calendar, I, in conjunction with many other contestants, feel that the scant mention received in "Amateur Radio" is deplorable and lacking in foresight. It is, I feel, a very poor public relations attitude to the contestants and almost a direct insult to the contest committee. To see the amount of work they have put into tabulating the results and gathering the remarks of the contestants, brushed off with a half column of figures and no remarks must be very disheartening to them to say the least.

However, I feel that having made a good point, Mr Hunt then tended to indicate that he had fallen by the way side.

Referring to Mr. Hunt's remarks on the A.R.R.L. Contest and the N.F.D being on the same week-end being a mistake, I make several points, firstly it is good advertising for the Australian Amateur Radio and for the N.F.D. to advertise on a busy band and the A.R.R.L. Contest sure makes the band busy, secondly, the QRM on the band sure gets rough at times, but is this not what we go portable for, to test our gear in the field under the toughest conditions possible? Where is the test of our gear if we have a nice clear band with only five contacts per hour and no QRM, and thirdly rough conditions QRM, etc., separates the men from the boys and the operators from the maybe's.

The aspect of having the N.F.D. on the same week-end as the A.R.R.L. Contest has, I feel, a lot to recommend it, for the main it gives us excellent practice in handling traffic under emergency conditions. Surely the matter of the numbers is a minor point, does it really matter, if, in the exchange of contacts we use numbers, place names or the height of the aerial, just provided that a contact has been established and can be confirmed, the essence of the contest is the speed of the operation, the ability to change bands, aerials, etc., without wasting time. Surely the waste of time trying to explain the difference in numbering system is overcome by accepting an accredited number from a station in the A.R.R.L. Contest and in return give the station the number next on your list. Thus numbers have been changed as required by the rules. So what's the difficulty-

Mr Hunt's P.S. I feel was an afterthought, without much thought, for in 1967 there was no A.R.R.L. Contest and yet the scores indicated very little change from 1966. As has been said, maybe it was conditions, or maybe it was another factor that Mr Hunt overlooked, a little thing called organisation. May I assure Mr Hunt that the scores of 6400 in the 1968 effort and 3786 in 1967 was no accident (actually the 1967 score should have been better, but for the fact that we had to re-build one set of gear in the field! These scores were achieved by organisation to the last detail by a team who did not let up, and after each effort the faults were pointed and ironed out before the next effort. Beams were built and tested months before, gear was overhauled and tested under portable conditions, and when the day arrived it was only a case of set up and go, not fumble and try and make it work. So organisation is the operative word not the A.R.R.L. Contest, not the conditions, but organisation. Our group organised ourselves 7 bands, 5 beams, a good cook, good operators and a lot of fun. Mr. Hunt, the big jump in scores was because the organisation got better, not for any other reason.

Finally, may I assure the readers that we are well on the way with organising our 1969 Contest and we anticipate an even better score. One thing we would appreciate is a little more effort on the part of the publicity committee and a lot more stations on the air in the contest.

Come on chaps, get off the tail, organise yourself for next year, and make the John Moyle Memorial N.F.D. a memorial to a real pioneer in Amateur Radio, who never shirked when the going got rough: make it a major contest and lift it out of the wet fizzer it has been for the past few years.

Who among you will exert yourself enough to challenge the 6400 points put up last year? Don't kill, kindle it!

—S. E. Molen, VK2SG
(One of the group of VK2AAH/P)

[The N.F.D. results were published exactly as received from the Contest Committee, the editorial red pencil never went near them.—Ed.]

R.D. CONTEST

Editor "A.R.," Dear Sir,

I take strong exception to David Rankin using his "Federal Comment" in "A.R." of August to snipe at the smaller Divisions. He should have remained objective in his remarks. He also should have checked the accuracy of his statements.

If David checks with the Federal Convention Minutes, 1968, he will discover that all States voted for the motion rescinding the 1967 rules, which after all were so full of holes that they looked like Mum's colander. These rules strongly favoured the larger States (all two of them) as long as everyone else remained honest. In 1967 any one of VK4, 5, 6 and, presumably, 7 could have wrested the victory from VK3 simply by submitting only their larger logs. However, better nature came to the top, they put Satan behind them, and VK3 won the Contest! Are these the rules the passing of which is mourned by David?

David's second last paragraph brought tears to my eyes, especially the bit about the larger Divisions (this time all three of them) losing interest in the Contest. I checked on the results in 1955—the 8th in the series. This is what I found

VK2 (1,074 licences), 69 logs, VK3 (1,008 lic.), 81 logs, VK5 (370 lic., 87 logs; VK4 (321 lic.), 46 logs, VK6 (189 lic.), 68 logs, VK7 (126 lic.), 52 logs. Note that VK3, **the third largest Division won that year**, and has won four times. Note also that VK2 could only rake up one more log than VK6. VK3 couldn't match the effort of VK5. Did VK2 or 3 deserve to win. They could have under 1067 rules.

Here then is the crux of the matter. We have discovered the secret of why the two largest Divisions cannot win the contest. It is lack of interest. They are not prepared to put any work into it. In VK6 (won it 8 times), we organise weeks before hand, we write letters to non members, we twist arms, we try to take care of those who have no gear themselves, we push it in Bulletin and Broadcasts. What does VK3 do? Personally, I say that when the largest Divisions stop crying, and settle down to a real effort to win the contest and prove that they can't do it, then is the time to "bias" it their way. So far they haven't made the effort.

—Bob Elms, VK6BE.

"AMATEUR RADIO" MAGAZINE

Editor "A.R.," Dear Sir,

The members of the West Australian Division of the W.I.A. feel that the publication of "A.R." is very necessary, despite increasing production costs.

"Amateur Radio" magazine is the only Australian magazine produced solely for the Radio Amateur, with articles of interest to all "Hams" and should be continued.

As a token of our faith in the people producing "A.R.," and to show our desire to enable continued production, we wish to donate $5 per month to help offset the increasing costs.

We sincerely hope that the production of "A.R." will continue and the present high standard can be maintained. Keep up the good work.

—K. Moore, Hon. Treasurer.

Publications Committee Report

Due to the postponement of the August meeting until after the September issue went to press, no report was included. When the meeting was finally held, technical articles were received from VKs 2ZGW, 3ACA, 3ZRY and 5EK. Correspondence was received from VKs 3RN, 3OM, 3SW, 3YC, 3ALM, 3AMK, 6BE, Treasurer VK6 Division, VK4 Central Coast Branch, LZ282, Peter Curran and Chris. Howitz.

Practically the entire evening was devoted to discussion on the future of the magazine, and much valuable assistance was received from a representative of "Technical News Publications" who attended our meeting. As a result certain proposals were formulated for the approval of the publishers, namely the Victorian Division. Their approval was required as there will be considerable capital expenditure involved, and a considerable amount of financial risk will be incurred.

Dealing with the more immediate problems, a short discussion was held on the Postal Regulations for the mailing of periodicals. In order to comply with the new regulations we have had to expend all the money so far received from the 2 cent increase received since last May. On the subject of finance, the Committee was very pleased to receive the letter from the VK6 Division (see Correspondence page). The gesture is highly appreciated.

The plans for the October, 35th Anniversary issue, were discussed and our friend from Technical News Publications volunteered his assistance, which was gratefully accepted.

At the September meeting correspondence was received from VKs 2JE, 2SG and N. Wilson. Technical articles from VKs 3ZOP and 5QX were considered. The meeting was advised that the proofs of the 1968/69 issue of the Call Book had been returned by the Department and that printing would commence as soon as the October issue of the magazine was completed. Orders are down on last year, and estimates show that we will just about come out square on this edition. Advertising income is down on last year despite all our efforts to gain extra advertisers.

A long discussion was held on the paper to be used for the October issue, and many samples examined. It was agreed that the finances would not permit the use of the paper considered best for the job, but it is hoped that the compromise between price and quality proves acceptable, both to our readers and advertisers.

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COLLINS 75-S1, fitted with c.w. filter, $400 or near offer. Viceroy Transmitter and Power Supply, $200. G. Bolles, 404 Geelong Rd., W. Footscray, Vic.

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FOR SALE: Drake 2B Receiver with crystal calibrator and mechanical filter $250 or nearest offer. H. Trutmann, VK3HV, 7 Nerita Gardens, Corio, Vic., 3214. Telephone Geelong 79111.

FOR SALE: Hammarlund HK-1B Electronic Keyer, with electronic key lever by Poucel Electronics. Price $35. Bill Hempel, Kyvalley R.D., Vic., 3621.

FOR SALE: Heathkit HW22A 40 metre Sideband Transceiver, covers 7.040 to 7.140 Mc. upper and lower sideband, as new, including handbook and two new final tubes, $150. J. Lauten, VK1JL, 28 Atherton St., Downer, A.C.T., 2602.

FOR SALE: Marconi CR100 Receiver and Table Top all-band Transmitter, Geloso v.f.o. and 6146 final, 807 modulators and 3-section separate power supply, $100 both units, prefer not to split. Also VK3APC translatorised 80 metre Receiver at less than kit cost, $60. Sundry Amplifier equipment, audio and power transformers, chokes, etc. VK-3AHG, 20 Grandview Road, Box Hill South, Vic., 3128. Phone 288-2024.

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FOR SALE: Rack mounted Xmitter, plate mod. 813 final, well metered, good appearance, bandswitched, $100 complete with mod. Swan 350 Transceiver, excellent appearance and condition, complete with s.w.r. meter and power supply, spare p.a. tubes, best offer. Write VK3ATF, C/o. Grant St., Point Lonsdale, Vic., 3225, or ring 52-1431.

FOR SALE: 1 Hammarlund 170A V.h.f. Rx in mint condition, complete with 2 metre converter and time switch clock, $400 o.n.o. C/o. 20 Alexandra Ave., Rose Park, S.A., or Phone 31-1638.

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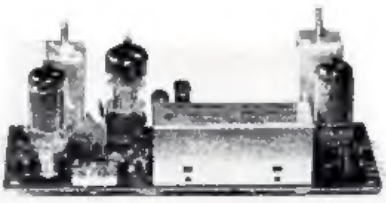

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